

# The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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## Improving Water-Powers.

The drainage from given areas has been referred to as a quantity that can be determined very nearly. For the purpose of doing this two factors must be taken into the account, the annual rainfall and the proportion of this that is lost to the streams by evaporation. Mr. Wells, in "Water-Power of Maine," estimates the rainfall in that State, which includes the depth of the water produced by the melted snow at 42 inches. In regard to the evaporation he says: "What proportion of the total annual rainfall is wasted by the atmosphere may be ascertained either by direct observation upon evaporation or measurement of the discharge of streams. In either case the experiments require to be conducted with care throughout the year, and, indeed, for a series of years. By neither of these methods has the yearly sum of the evaporation in our State been determined, and of the data needed for the determination only a few elements, as the minimum and maximum delivery of a few of the rivers, are at command. The percentum of actual water waste can, however, be arrived at with tolerable accuracy by reference to the statistics of evaporation in other districts, with suitable allowance for the difference of latitude, temperature, winds, ocean exposure, &c."

After examining the returns from various districts where the proportion of evaporation to rainfall had been determined, and finding it from 50 per cent. at the Schuylkill Naval Reservoir, and 55 per cent at the Long Pond, Boston, Water Works, to 67 per cent. in England and Ireland, 75 per cent. upon the Mississippi River basin, and 85 per cent upon the basin of the Missouri River, he concludes that on the whole it would seem safe to assign as a figure very closely approximating the actual annual evaporation 60 per cent. of the yearly downfall. In other words, of the 42 inches of received yearly, 25.2 inches are absorbed by the atmosphere and 16.8 inches pass off by the rivers to the sea. In this connection the common misapprehension that is frequently exhibited in regard to the capabilities of such reservoirs for retaining water may be mentioned. Many people are hardly ready to entertain the idea that six months are required for an opening capable of passing 8 cubic feet per second to draw the water from a reservoir containing 127,000,000 cubic feet. The remark is frequently heard in regard to such a reservoir that it must be fed by springs to enable it to hold out so long, when in reality the ratio of the water delivered was in proportion to the whole volume somewhat less than the proportion given, the difference being necessary to account for the loss by evaporation during the dry and hot weather in the summer. When it is recollect that the loss of moisture by evaporation from large districts of country in this latitude is estimated at fully 25 inches each year, the necessity for making such allowance will be appreciated. Besides this, the loss from the surface of lakes or ponds must be greater on account of the exposure than from the dry ground. The rivers of vapor lifted from the ocean and conveyed landward by the atmosphere, to be condensed there and form the water supply that is drained by the streams and rivers from the highland to the sea, and furnish the power in its descent for driving mills, may be mentioned as evidence of this.

One thing has been omitted in giving directions for building these dams of stone and wood upon small streams, particularly where the water is drawn from a reservoir about to supply power in the dry seasons, and that is to exhibit the necessity of making provision for drawing it off to the bottom of the pond whenever there is occasion to do so for convenience in making repairs. In many of these dams the wall was laid across the stream to the height of the bottom of the flumes, using the largest and best stones for the faces on each side and filling the center with smaller ones or such as were not suitable for laying on the outside, packing them well. Judging from the appearance, the impression prevailed at the time that the water would pass off freely through the spaces between the stones whenever the planking was removed for the purpose of renewing it, but when subjected to the test of actual trial it will not, and the

only alternative is to do the work with the water standing several feet in depth, or take down the wall for the purpose of drawing it off. In pursuing the latter course a growth of the lower forms of vegetation is found among the rocks that have partially filled the spaces between them. With a little sediment added, nature completes its work, and has formed a tight dam that grows higher gradually among them. The remedy is to have an open passage through the dam in the lowest place large enough to carry off the water that usually runs at the time repairs are made. This matter obviously deserves

pulley has an extra thick rim and an elongated and enlarged hub. The inner part of the rim between the pulley-arms and the edge next to the mill is turned true together with the corresponding part of the hub. Between the rim and the hub is placed the paper friction pulley D, as shown in Fig. 2 and in the diagram on page 7. The shaft of this pulley runs in movable boxes and may be moved back and forth by means of an eccentric underneath the box next to the pulley and connected with the rod O, which in turn is connected with a lever operated by the sawyer. Power is transmitted from

the malleable-iron feed-chain from one set of sprocket-wheel to the other, either larger or smaller, as the case may require. The chain is kept taut by means of the lightning pulley G, worked by the lever H. With double mills a pulley, E, is furnished for running the top saw; M is the wedge-wheel or splitter; I is the saw guide and K is the log slide. The carriage and set rig are shown in the perspective view. The set rig is of the double-acting type, setting the knees forward at each movement of the set lever. It can be adjusted by the sawyer to from  $\frac{1}{2}$  to 1 inch at each throw of the

## History and Aims of the Brotherhood of Locomotive Engineers.

A concise and instructive review of one of the most powerful and best conducted labor organizations in the country was the feature of the Congregational Club meeting at Cleveland. Mr. P. M. Arthur was the speaker, and the Grand International Brotherhood of Locomotive Engineers, of which he is the chief, formed the theme of his address. He stated in opening that he had prepared no set speech, but would give a plain statement of the progress of the organization, and the plan on which it was conducted. Twenty-five years ago the locomotive engineers were organized and were looked down upon by the public for the reason that in too many cases there was on their part a lack of self-respect. It should not be understood, however, that the brotherhood is formed altogether of reformed drunkards, for 25 years ago there were many noble exceptions to the general rule. They were regarded with distrust, and from the fact that many yielded to the temptation afforded by the nature of their occupation they found many defamers. Early in the sixties a few men on the Michigan Central Railroad conceived the idea of forming an association, and five of the number held a meeting at Marshall, Mich., for the purpose of considering the question. This was followed by an invitation to the employees of adjoining roads, and they held a meeting at Detroit. A constitution and by-laws were adopted and Detroit Division No. 1, Brotherhood of the Footboard, was organized. Sobriety, truth, justice and morality formed the basis of the order, and their motto was, "Do unto others as you would have them do unto you, and thus fulfill the law." To the fulfillment of these principles much of the success of the organization is ascribed. Twelve divisions were formed, and the present name was adopted at a convention held in Indianapolis August 17, 1864. When first organized the brotherhood was looked upon with suspicion, strikes and dictation to employees being supposed to be its object. It now includes 320 subdivisions, and nine-tenths of the best engineers on the continent. A monthly magazine devoted to the interests of engineers, the first number of which was issued in 1867, now has a circulation of 10,000 copies, and is sent to all parts of the world. One of the features of the publication is the names of all expelled or suspended members. Some objections were urged against it, but it has been found that fear of exposure has had the effect of preventing wrong-doing.

On December 3, 1867, an insurance association was formed within the brotherhood on the mutual assessment plan. It has paid to the heirs of deceased members \$1,852,000, and has disbursed to the needy and distressed over \$500,000. The organization has reformed many a man, and its whole object is elevating. To become a member a man must have one year's experience as an engineer, be of good moral character, temperate habits and able to read and write. Political or religious discussions are not permitted in any of the divisions, but every influence is brought to bear to induce a man to lead an upright life. Mr. Arthur stated that he would say in all candor that they were not ashamed of their strikes, and under like circumstances would strike again. All efforts are exhausted to secure a peaceful settlement and are usually successful. In every instance where a railroad manager has refused to confer with a grievance committee a strike has resulted and the men gained their end. Three strikes were

caused by the discharge of men without cause. In 1876 a new manager of a Canadian railroad discharged men who had been employed by the company from 20 to 30 years. He did it without provocation and on the supposition that he would rid the road of "the committee." The master was investigated, the men found to have been wronged, and a committee asked that they be reinstated. The committee was treated with contempt, but found opportunity to inform the manager that unless he acceded to their requests every engineer on the road would go out at 9 o'clock the following Friday night. He laughed at the idea. They deserted their engines promptly on time. After three days the haughty railroad manager, in dismay, asked for a conference, and

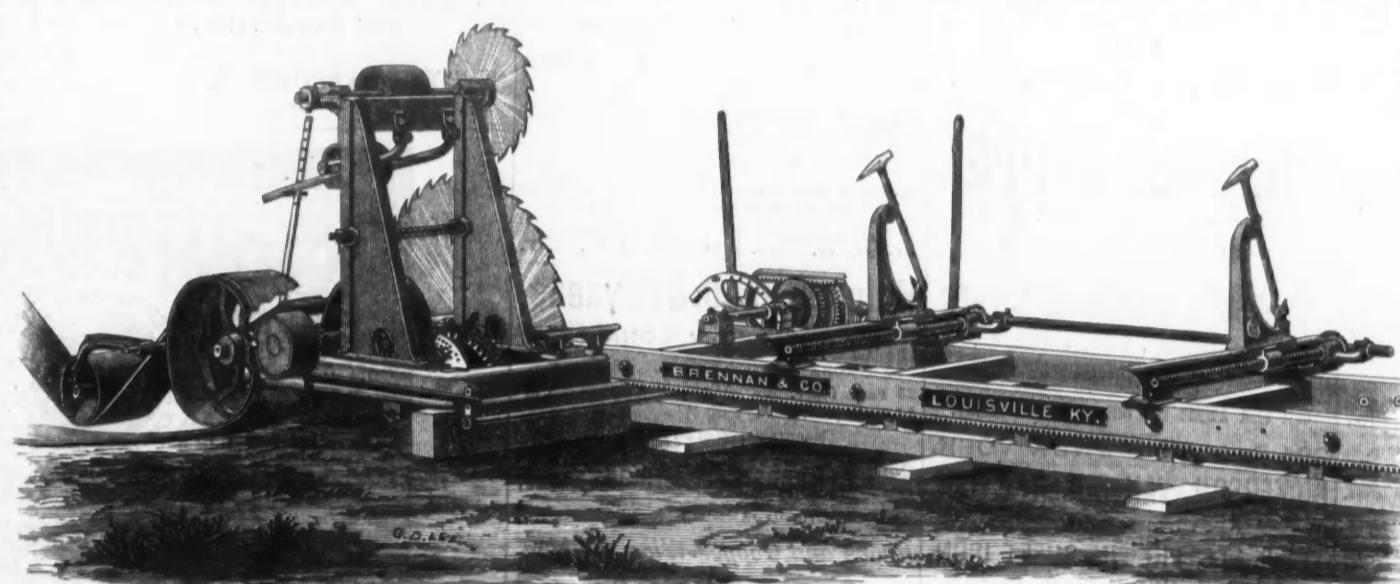


Fig. 1.—Perspective View.

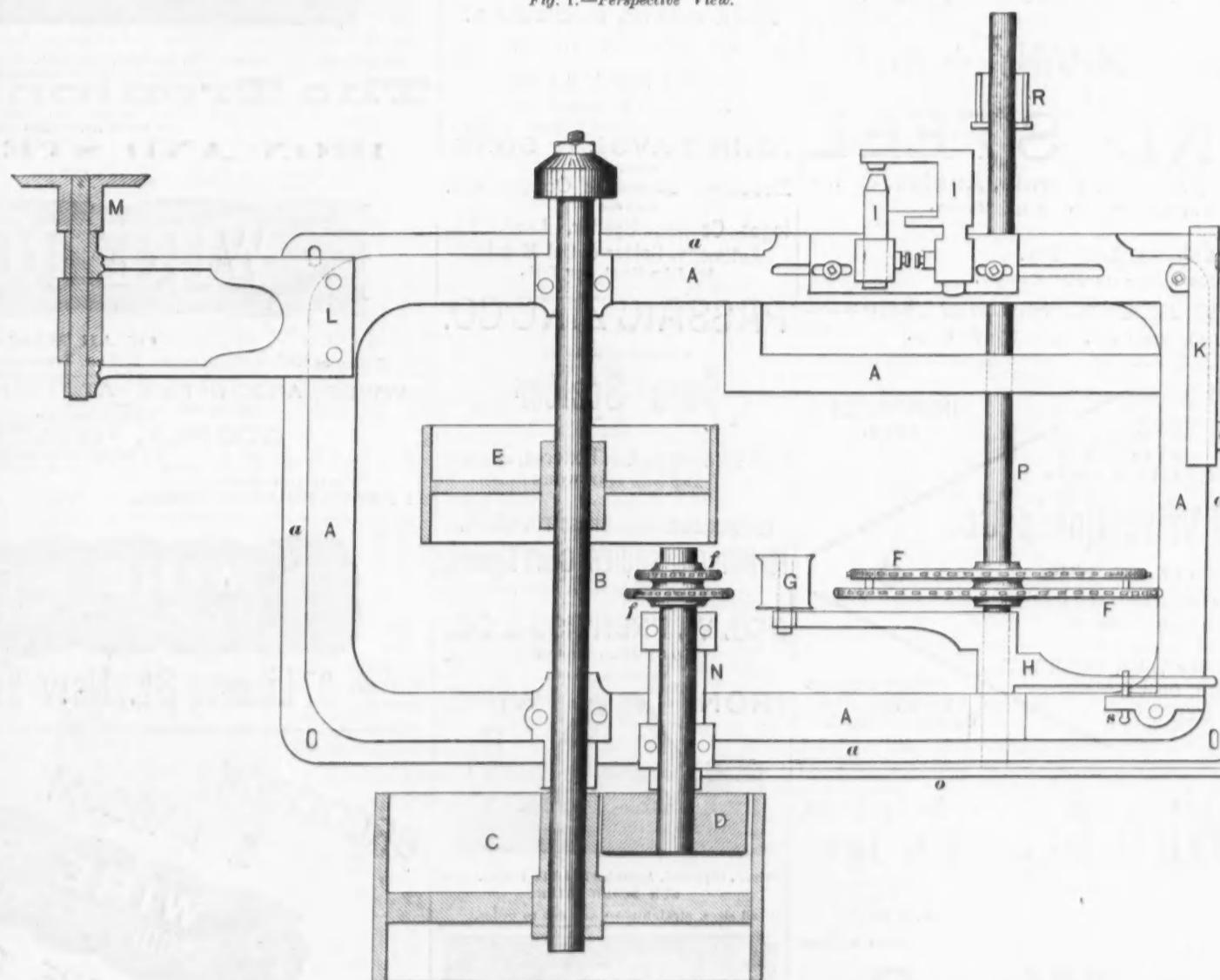


Fig. 2.—Plan of Power Transmitting Mechanism.

NEW CIRCULAR SAWMILL, BUILT BY BRENNAN & CO., LOUISVILLE, KY.

attention, and if duly considered in building a dam much unnecessary trouble will be avoided in subsequent operations.

## A New Circular Sawmill.

Our engravings on this page represent a new circular sawmill just built by Messrs. Brennan & Co., of Louisville, Ky. It is novel in many respects, and as it is probably one of the simplest and most compact mills of its capacity now on the market an examination of its more important features will prove of some interest. The frame A A (Fig. 2) is made of cast iron, in one piece, and is well proportioned. Opposite the saw collar on the mandrel B is the driving pulley C. This

is the pulley C to the pulley D and to the small sprocket-wheels f f mounted on the same shaft. From these the power is taken by the larger sprocket-wheels F F by means of a malleable-iron chain and finally by means of the shaft P to the pinion R. This works in the rack underneath the saw-carriage. By pressing the lever connected with the rod O in one direction the friction pulley D is brought to bear against the hub of the pulley C, and the carriage is accordingly fed toward the saw. By reversing the pressure on the lever the pulley D ceases to bear against the hub of the pulley C and is pressed against the rim. The motion of the saw-carriage is thus naturally reversed also, and the carriage travels back rapidly.

Different speeds are obtained by shifting

lever, increasing or diminishing the set by thirty-seconds or sixteenths of an inch at each throw, if desired. The setting blocks are of wrought iron. The mills will carry saws up to 58 inches in diameter, with a 24-inch top saw on the double mills. The carriage is 24 feet long on the rack side, and 22 feet on the short side.

Among the papers just issued by the secretary of the American Institute of Mining Engineers is one by Arthur F. Wendt, New York City, illustrating and describing a sectional hanging pipe hot-blast oven designed by him for the spiegel furnace of the Lehigh Zinc and Iron Co., at Bethlehem, Pa.

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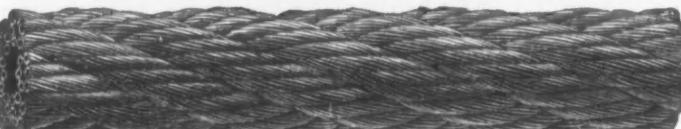
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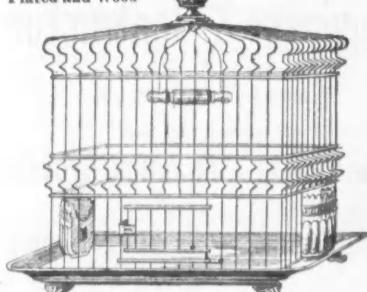
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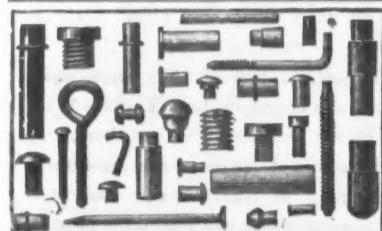
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Skelp, Blue Annealed and Common.

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As regards the steel-rail men, I have information which leads me to suspect that some of them are growing amazingly uncomfortable under the current selling prices. At about £3. 10/- or from that to £3. 15/- ton there is said to be nothing in the way of profit that is worth fighting for, albeit two or three of the larger concerns appear to have made up their minds that the Germans must bid very low indeed if they mean to get any new business from the neutral markets. The Germans are bidding their time, and say they are not by any means unwilling to let the Britishers lose a fair amount of money before the real struggle begins, at which juncture the Teutons allege that they will be found to be on hand and lively. The situation is somewhat complicated by the circumstance that several of the home and other railways are endeavoring to buy for three or four years ahead at about the present prices, their impression being that these low values are scarcely likely to last long. Their action is justifying their inference, inasmuch as their inquiries have induced the rail men to quote rather higher figures already, and if any orders should be placed it is not unlikely that we shall see £4 quoted, and perhaps passed, for home orders within the next few weeks. For export the case may be very different, for obvious reasons.

THE IRON MARKET

last week, despite the holidays, occupied a position slightly in advance of that which has lately ruled, but the change has been more manifest in Scotland than elsewhere.

Buyers are disposed to place their orders for further forward delivery than they were a week or two ago, but holders are not anxious to take long contracts either for large or small lots. Shipments from the Clyde, though below a general average, are rather better than they were expected to be, although no material difference is noted as to the amount of iron which is being placed in store. The warrant market has slightly advanced, and closed at 38/0. In Cleveland there has also been a slightly better tone, and 30/- have been asked for No. 3 G. M. B. Sellers, too, are more disinclined than before for forward delivery, and express themselves confident that better prices are near at hand. Shipments are now fairly good from Middleboro', but the amount of iron in store is about the same as

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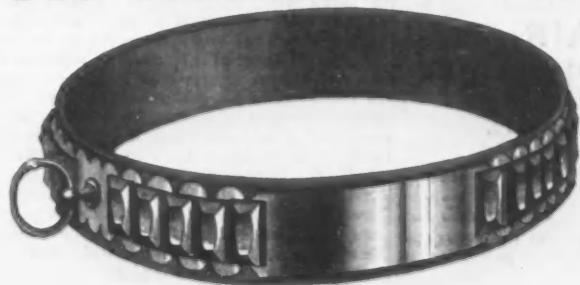
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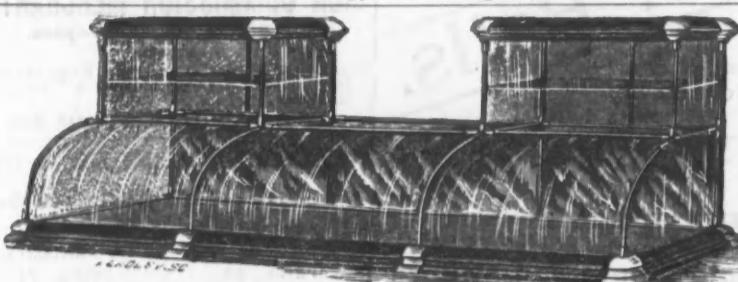
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Established 1861.  
**THOMAS C. BURROWS,**  
Agent for Jersey City Steel Company,  
Successors to Jas. R. Thompson & Co.  
**STEEL** Of All Descriptions.  
WAREHOUSE, 99 and 101 JOHN ST., NEW YORK.

**SANDERSON BROS. STEEL CO.,**  
SYRACUSE, N. Y.

MANUFACTURERS OF THE CELEBRATED  
**Sanderson Bros. & Co.'s**  
**Fine Cast Steel**  
FOR TOOLS, DIES AND ROCK DRILLS.

Branch Warehouse: 39 Fort Hill Square, Boston.

**FARLEY & HOFMAN,**

ROCHESTER SHOW CASE WORKS,  
Manufacturers of SHOW CASES of every description. Highly finished wood cases with patent bell-metal joints a specialty, and the best in the world. Branch stores, 46 West Broadway, New York; 96 Sudbury St., Boston, Mass. Catalogues sent on application. Mention The Iron Age.  
Office and Factory, 29, 31 & 33 Water St., Rochester, N. Y.

**INDESTRUCTIBLE****Furnace Lamp,**

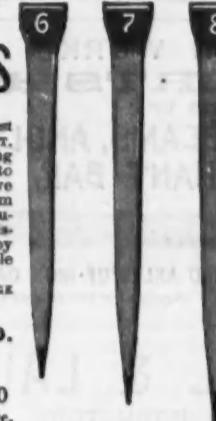
MADE BY

**TAYLOR & BOGGIS**  
FDY. CO.,

Cleveland, - Ohio.

2 Sizes - 3 Pint and 2 Pint.

It has no Seams or Solder in  
Its Construction.

**LARGE HEADS.****CHAMPION****Horse Nails****CITY HEADS.**

Manufactured from very best SWEDISH METAL. Will not SPLIT.

Are accurately pointed, tough, strong and hold the shoes. Soft enough to clinch readily; stiff enough to drive without bending. All nails uniform and perfect. They are used in thousands of shops with the best of satisfaction, and are especially liked by "floor-men" for their good, reliable driving.

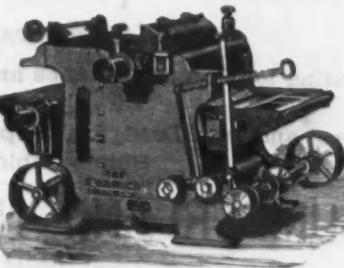
Made in two patterns, "LARGE HEADS" and "CITY HEADS."

**QUALITY GUARANTEED.**

LIST:

Nos. 4 5 6 7 8 9 10

5c. 25c. 25c. 22c. 21c. 20c.

**CHAMPION HORSE NAIL CO., Appleton, Wis.****WOOD WORKING MACHINERY**

Planing Mills, Carpenters and Builders,  
Furniture and Chair Factories, Car  
and Agricultural Works, and  
General Wood Workers.

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**THE EGAN CO.,**  
Nos. 179 to 199 W. Front St.,  
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MANUFACTURERS OF RIVERSIDE

**STEEL NAILS**

Pig Iron, Bar Iron, Bar Steel, Steel Blooms, Steel Billets,  
Small T Bars, Flat Bars of Iron or Steel, Fish Bars of Iron or Steel.

WHEELING, W. VA.

**WROUGHT IRON****BOILER TUBES.**

Steam, Gas and Water Pipe, Oil  
Well Tubing, Casing  
AND

**LINE PIPE.**

Cotton Presses, Forgings, Rolling  
Mill and General Machinery.

**READING IRON WORKS.**

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FRANKLIN S. MILES,  
Manufacturer of  
Brass, Iron, Steel and German Silver  
SCREWS,  
205 Quarry St., Philadelphia.

**LOVELL ALL CLAMP ROLLER SKATE!**

We Challenge the World to Produce its Equal.  
Sample Fair sent postpaid on receipt of price.



PRICE, \$6.  
Nickel Plated and  
Polished.

**CHAMPION**  
SINGLE BRECH-LOADING

SHOT GUN.

Top-Snap Action, Pistol Grip, Rebounding Lock, Patent  
Horn-and-Plating, Good workmanship, convenience of  
manufacture, hard and strong shooting, durability, and beauty  
of finish, this Gun has no equal and challenges the world.

PRICES:  
Plain Barrel, 12 bore, \$15.00; 10 bore, \$16.00.

BEAN'S PATENT



PRICE:  
Cuff Plated, \$4.75  
Cuff Polished, 4.00

Sent by mail, postpaid, on receipt of price.  
Special catalogues of Police Clubs, Hand Cuffs, Leg Irons,  
Police Hooks, Chain Twisters, Pocket Holsters, Police Dark  
Lanterns, &c. Sent Free on application.



Double Action Ejector Revolver.

PRICE, \$7.50.

Using 25 S. & W. C. F. Cartridges. Sent postpaid on receipt of price.  
Send 6c. in stamp for large catalogue of Roller  
Skates, Bikes, Revolvers, Air Bikes, Police  
Guns, &c. etc.

JOHN P. LOVELL'S SONS, Boston, Mass.

Prices to the trade sent on application.

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MANSFIELD, OHIO,  
Manufacturers of  
Iron, Brass and Brass-Cyl.  
Indoor Cisterns, Pitcher  
Well and Force



PUMPS.

Windmill, Boiler Feed  
Horizontal and Rotary  
Pumps.

Hydraulic Rams, Iron  
and Brass

CYLINDERS  
of every description,  
and other

HYDRAULIC MACHINERY.

**TYRONE IRON CO.,**

Works at Tyrone Forges, Blair Co., Penn.  
MANUFACTURERS OF

BEST CHARCOAL BLOOMS  
and BOILER TUBE SKELP.

ALSO TACK AND NAIL PLATE.

Blooms guaranteed and especially adapted  
for stamped ware.

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Measuring Tapes

of Cotton, Linen and Steel.

FOR ALL PURPOSES.

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MANUFACTURERS OF  
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FORCE

PUMPS  
Wind Mill Pumps, Hand and  
Power Rotary  
Pumps

HYDRAULIC RAMS,  
Boiler Feed Pumps, Gar-  
den Engines, &c.  
Also Carriage Makers' Tools,  
Blacksmiths' Drills, Butch-  
ers' Tools, and Feed Cut-  
ters.

Write for Catalogue and Prices.  
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GENERAL WESTERN AGENTS.

European Agency with SELIG, SONNENTHAL & CO.,  
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JOHN MAXWELL,  
MANUFACTURER OF PATENTED  
BRASS, BRIGHT  
TINNED WIRE  
& JAPANNED

BIRD  
CAGES.

The cheapest and  
most salable in  
market.  
Catalogues and  
Price Lists furnished  
to the Trade.  
247 & 249 Pearl St.,  
New York.

Full size of band for Brass and Tinned Wire Cages."



DUNBAR BROS.,  
Manufacturers of  
Clock Springs and Small Springs  
of every description, from best Cast Steel.  
BRISTOL, CONN.

FIELD'S  
IMPROVED  
FORCE PUMPS.  
Latest, Cheapest  
and Best.  
Household, Orchard  
and Well  
Force Pumps,  
Pitcher Pumps,  
Tube Well Pumps.  
ECONOMY  
Garden Engine.

Send for Catalogue.  
Field Force Pump Co.,  
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New England Agency with Fuller, Davis & Fitz,  
Boston, Mass.  
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Chicago, Ill.  
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BROWN & PATTERSON, Marey Ave. and Hope Street,  
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D. S. JENKINS,  
Brockton, Mass.,  
MANUFACTURER OF

TACKS, BRADS, &c.

We make a full line of goods of first  
quality. Write for Price and Sam-  
ple. Satisfaction guaranteed.  
Goods delivered to points  
east of Rocky  
Mountains.

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Solid Braided Window Sash Cord.  
The most durable and economical.  
Send for Samples to the Manu-  
facturer.  
J. P. TOLMAN & CO.,  
Cor. High and Hamilton Sts. Boston, Mass.

W. & B. DOUGLAS, Middletown, Conn.,

The Oldest and Most Extensive Manufacturers of

Pumps, Hydraulic Rams, Garden Engines,

Yard Hydrants, Street Washers, Galvanized Pump Chain, Wind Mill Pumps  
and Other Hydraulic Machines in the World.

Fig. 120.



Fig. 365.

Fig. 209.



Fig. 70.



### "THE AQUANETTE,"

shown in the illustration, is a new article we are introducing, designed for showering trees, shrubs, &c., as an insecticide, intended to carry in the hand, with pail on the arm. It will throw a good stream 40 or 50 feet high.

Sent by Express, C.O.D., \$6.00.

LIBERAL DISCOUNT TO THE TRADE.

BRANCH WAREHOUSES:  
85 and 87 JOHN STREET, NEW YORK, and 197 LAKE STREET, CHICAGO, ILL.

UNION MANUFACTURING CO.  
SOLE MANUFACTURERS OF  
Skinner's Patent Combination Chuck.  
UNIVERSAL, INDEPENDENT AND ECCENTRIC.



UNION MANUFACTURING CO. New Britain, Conn.  
WAREHOUSES, 103 Chambers Street, New York.

GEORGE BROOKE, President.

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THE E. & G. BROOKE IRON CO.,  
BIRDSBORO, BERKS CO., PA.,  
MANUFACTURERS OF

**ANCHOR NAILS AND SPIKES. BRAND**

Capacity, 2000 Kgs per Day.

Made from their own Pig Iron, insuring Regularity and Superiority in Quality.

ALSO

FOUNDRY AND FORGE PIG IRON,  
AND COLD BLAST CHARCOAL CAR WHEEL IRON.

**OLD DOMINION**  
**CUT NAILS, BAR IRON.**

R. E. BLANKENSHIP, President,

RICHMOND, VA.

IRON AND STEEL DROP FORGINGS

All shaped, small and large, including  
GUN, PISTOL, WRENCH BARS, &c., ALSO, DIE SINKING. MANUFACTURERS ALSO  
OF BRICKLAYERS', MOULDERS' AND PLASTERERS' TOOLS,  
SADDLERS' ROUND AND HEAD KNIVES.

WILLIAM ROSE & BROS.,  
36th & Filbert Sts., WEST PHILADELPHIA.

NATIONAL HARDWARE & MALLEABLE IRON WORKS,

Lehigh Avenue, American and Third Streets, Philadelphia.

THOMAS DEVLIN & CO.,  
MALLEABLE, FINE GRAY IRON AND STEEL CASTINGS made from patterns to  
order. Special attention given to Tinning, Bronzing, Coppering, Japaning and Fitting. A large line  
of Carriage and Wagon Castings constantly on hand for the trade.

C. F. RICHARDSON, ATHOL, MASS., Manufacturer of  
IRON LEVELS.

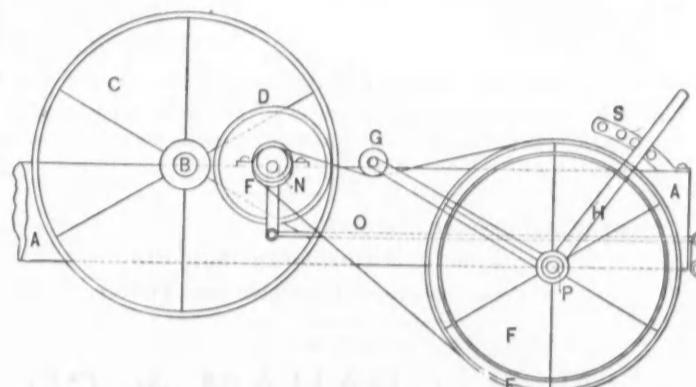
before. Although 30/- is quoted, there are lots to be obtained at a lower figure from intermediate holders who are under the necessity of selling, and it is not likely that better prices than those now quoted will rule until the stocks held by those who feel the pinch of depression are cleared off. This latter remark can also be applied to the West Coast, where, although inquiries are numerous and shipments are fairly good, yet sales are being effected at rates below 42/- for mixed lots. In Staffordshire no material change is to be reported; neither can anything new be mentioned as to galvanized sheets or wire. In the manufactured departments there has been no advance, and makers are uneasy as to what is to follow the work at present in hand. Old scrap still continues dull, but late rates prevail, as the market is but poorly supplied.

Freights for pig iron from Glasgow to New York by ordinary steamer remain at 5/- Steel remains as of late, makers being employed tolerably well, although all of them would welcome further orders not only to occupy a larger part of their works, but also to keep their places going upon the completion of orders now in hand. Steel sleepers are still quiet. Steel rails are a little stronger, and in view of an early rise from £3. 12/6, as now quoted, several Welsh makers have refused £3. 15/- for flanged rails, asking from £3. 17/6 to £4, according to the section. Rumor has it that some large orders are contemplated for railway development in the antipodes. New Zealand is mentioned in some quarters as the scene

chiefly on Bessemer and Siemens steel plates with coke tinning, and some fair lines of coke tin were in request as well. Some makers have put up prices because of the advance in tin, while others have not, and the latter therefore secure the bulk of the business. Quotations have been advanced generally, and coke tins are now quoted firmly at 13/6 @ 14/- IC, and Bessemer ditto, also Siemens steel plates 14/3 @ 14/6 IC. The demand for charcoal tins and ternes is still quiet, and it is hardly any use expecting any advance in the prices. There is no change from last week's prices. Coke tin and Bessemer steel coke wasters are in good demand at 12/3 @ 12/9.

#### THE HARDWARE TRADES.

In London the Whitsuntide holidays have largely interfered with business, a considerable number of London agents availing themselves of the opportunity of visiting headquarters in the provinces and comparing notes on the transactions during the current quarter. To all intents and purposes we are entering upon the dead season in the metropolis, and that combined with politics cannot fail to affect business. At Birmingham the disturbing influence of the holidays upon trade is not relieved by the commencement of the stock-taking period, which necessitates a temporary suspension of deliveries to many merchants and factors. Railway orders for lamps, carriage fittings, tubes, &c., have been arriving more freely during the past few weeks, but in other respects home orders are reported very slack



New Circular Sawmill.—Fig. 3.—Diagram of Friction Pulley, Chain Tightener, &c.  
(For description see 1st page.)

of action, while in others it is believed to be  
Western Australia, but whichever colony it  
is may it is stated that sufficient progress  
has been made to enable the promoters to  
approach one or two firms as to a portion of  
a first installment of 80,000 tons of steel  
rails and 120,000 tons of steel sleepers, this  
latter being by far the largest order ever  
specified.

SCOTCH PIG IRON  
is a shade better, but that is about the best  
I can say for it, seeing that the shipments  
are still far in arrears, and the reserve  
stocks are still being added to on a very  
large scale. While these conditions hold  
good a furnace or two at work more or  
less does not seem likely to greatly affect  
the course of the market. There are now  
85 furnaces at work in Scotland, against 91  
a year ago. In Connell's stores there are  
776,214 tons (an addition of 2552 tons last  
week), as against 599,348 tons this date in 1885. Shipments are 35,771 tons behind  
this year, while the imports of Middleboro' pig  
iron into Scotland are 24,835 tons behind  
hand. Current prices:

No. 1.	No. 2.	No. 3.
Gartsherrie, at Glasgow.....	42/-	41/-
Coltness.....	47/-	45/-
Langloan.....	49.6	41/6
Summerlee,.....	47/-	41/-
Cadzow,.....	46.6	41/-
Carnbee,.....	42/6	39/6
Clyde,.....	42/6	39/6
Monikland,.....	39/6	35/6
Quarter,.....	39/6	35/6
Govan, at Broomehill.....	39/6	35/6
Shotts, at Leith.....	44/-	45/-
Carron, at Grangemouth.....	47/6	44/6
Kinnel, at Bonness.....	45/6	42/6
Glenarnock, at Ardrossan.....	45/-	40/-
Eglinton,.....	39/6	36/6
Dalmingham,.....	40/6	38/6

MIDDLEBoro' PIG IRON  
is dull at about 29/6 @ 29/9 for No. 3, and  
G. M. B. sorts are quoted as under, f.o.b. at  
makers' wharves in the Tees:

No. 1 Foundry.....	32/3	Mottled.....	28/3
" ".....	31/3	White.....	27/9
" ".....	29/629/9	Refined metal.....	46/6
" ".....	29/9	Kentledge.....	33/6
" ".....	29/9	Cinder.....	30/

HEMATITE PIG IRON

is steady at about 42/- for mixed numbers in  
usual proportions, while West Coast makers' brands are as below:

No. 1.	No. 2.	No. 3.
Cleator.....	42/3	42/3
Lonsdale.....	42/-	41/9
West Cumberland.....	42/-	41/9
Lowther.....	42/-	41/9
Distington.....	42/-	41/9
Solway.....	42/-	41/9
Maryport.....	42/-	41/9
Harrington.....	42/6	42/6

There are 40 furnaces in blast in the district, compared with 44 a year ago. The reserve stocks in stores only are 112,288 tons, or 13,121 tons more than at Christmas last. Shipments of pig iron are 24,253 tons ahead of last year's, while the rail shipments are 1834 tons behind those of last year to the same date.

#### TIN PLATES.

In London since the resumption of business a stronger inquiry has been felt by dealers and agents, and the market is certainly to some extent firmer than it was a week ago. Most of the works are reported to be well off for orders, and some of the leading houses are not at all anxious to book further orders except at a substantial advance. I quote good ordinary brands of IC cokes 13/6 @ 13/9, f.o.b. Liverpool. At Liverpool the Whitsuntide holidays have rather interfered with business. Business, however, has revived during the last few days, and buyers evince a great deal of anxiety to secure their requirements for some time forward at the very low prices that are now ruling. The inquiry has run

A very elaborate and valuable paper has been published by Dr. John B. Porter, of Cincinnati, Ohio, on the iron ores and coals of Alabama, Georgia and Tennessee. It was presented before the American Institute of Mining Engineers. Dr. Porter gives a general description of the region, and a map showing the coal fields, and then goes into a discussion of the lower ores, the red ores and the metamorphic ores, classifying among the latter the Cranberry, the sub-carboniferous ores and the ores of the carboniferous. An appendix contains a very large number of analyses of ores, pig irons, coals and limestones.

On February 2, 1865, a patent was granted in France to Micolon & Senchancez, which contains the following: "Considering that time is the most refractory of all materials, we propose for certain cases to make the linings of furnaces of bricks of quicklime agglomerated by press, after intimately mixing with traces of oil or tar, and with 4 per cent. of pulverized coke, zinc white and silica. Under these conditions traces of bisilicate are formed which maintain the agglomeration of the lime without, however, leading to fusion."

Buffalo is one of the chief gateways between the grain fields and stock farms of the West and the markets and shipping ports of the East. Twenty railroads center there, including all the trunk lines but two. There are five regular lines of propellers to all the ports of the lakes, besides large numbers of other vessels that swelled the total number of arrivals and departures last year to 6934, representing a total tonnage of 4,195,875. During the same time the clearances on the canal were 5670. The receipts for last year by lake were 64,320,230 bushels, and the total receipts by lake and rail 60,000,000 bushels—equal to 34 per cent of the receipts in New York City.

</



**McCaffrey & BRO.,**  
For Superiority.  
PENNSYLVANIA FILE WORKS,  
Philadelphia, Pa., U. S.  
PARIS  
M. G. & B.

Manufacture and keep in stock a full line of FILES and RASPS only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

Superiority acknowledged wherever used, sold or exhibited.

**GAY & PARSONS,**

MANUFACTURERS OF THE

**Double-Action Ratchet Screw Driver.**

ONE OF THE VERY BEST TOOLS EVER INVENTED.



The above Cut shows the action or mechanism complete, also an end view of the Ratchet and Paws, to which we wish particularly to call your attention, as in all ratchet movements, of whatever kind or nature, the RATCHET must be the principal and most important part employed.

*It combines greater Strength,  
Convenience and Durability than can  
be obtained in a common Driver.*

FOR CIRCULARS AND PRICES, ADDRESS OUR AGENTS

**JOHN H. GRAHAM & CO.,**

113 Chambers Street, NEW YORK.



**LIGHTNING HAY KNIVES.** WETMOUTH'S PATENT.



This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bale, cutting corn stalks for feed, cutting peat and ditching marshes.

The blade is best cast steel, spring temper, easily sharpened, and is giving universal satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for farm and home trade, and it seems destined to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each of 6 pounds weight, suitable for shipping by land or water to any part of the world.

MANUFACTURED ONLY BY

**HIRAM HOLT & CO.,** East Wilton, Franklin Co., Maine.

For sale by the Hardware trade generally.

#### CAUTION:

We are informed that various parties are infringing upon the widely known Letters Patent granted originally to George F. Weymouth for an improved Hay knife.

The principal feature of the invention is a curved blade, provided with saw-tooth cutting edges, and furnished with suitable working handles. It is our purpose to prosecute all infringements, and to hold responsible to the full extent of our ability and of the law all parties who manufacture any knife infringing upon the patent, or who deal in the same. Several suits have been already ordered.

All manufacturers and dealers are hereby warned of our rights, and the public are cautioned against purchasing any Hay Knives which are not of our genuine manufacture.

**HIRAM HOLT & CO.**

EAST WILTON, May 10, 1886.

**TACKS AND STAPLE**  
A COMPLETE LINE OF  
Double Pointed & Steel Wire Tacks, Blind, Bed Spring, Telephone & other Staples.  
The Large Head 1 1/4, 1 1/2, Full Weight, Steel Wire Tacks, Uniform, Dbl. Uniform, are put up either in paper or Assorted in paper. Worcester Tack & Staple Co., Outside of all Combinations. S. H. LARNED, Worcester, Mass.

**RIPLEY & BARTLETT,**  
MANUFACTURERS OF  
Swedes and American Iron Tacks of all Kinds.  
TRUNK AND CLOUT NAILS  
A SPECIALTY.

Any variation from regular sizes and shapes made to order from samples.

**TACKS & WIRE NAILS**

BOSTON SALESROOM,  
70 Portland St.

BALTIMORE SALESROOM,  
73 German St.

NEW YORK SALESROOM,  
116 Chambers St.

AMERICAN TACK CO., Fairhaven, Mass.



**Nicholson**

Trade

Extra [XF] Fine,

Mark,

**FILES.**



**Needle Files.**

The Round Handle are Manufactured in 4 Lengths, as Shown above, viz.:

4 in., 4 3/4 in., 5 1/2 in., 6 1/4 in.

OF TWELVE DIFFERENT KINDS.

Round, Half Round, Flat,  
Oval, Knife, Square,  
3-Square, Equaling, Slitting,  
Joint, Barrette, Marking,

and of 3 different degrees of fineness of cut, Nos. 2, 4 and 6.

These Files are used by Jewelers, Silversmiths, Tool and Die Makers, and every Mechanic should have a dozen or more in his tool chest.

**The Square Handle**

a more delicate file for the use of Watchmakers. Made 5 1/2 in. long, as shown above, and of the same shapes and cuts as the round handle, or of finer cut if desired.

**NICHOLSON  
FILE CO.,**  
PROVIDENCE, R. I.,  
Sole Manufacturers.

**BLACK DIAMOND FILE WORKS.**



TRADE MARK.



**G. & H. BARNETT,**  
21 to 43 RICHMOND STREET, - - - PHILADELPHIA.

**CHARLES B. PAUL,** MANUFACTURER OF **HAND CUT FILES,**

Warranted Cast Steel. 187 Tenth St., Williamsburg, N. Y.

All descriptions of Files made to order. Price List mailed on application.

Established 1863.

**THRIFT FILE WORKS,**  
Manufacturers of all kinds of  
**FILES, RASPS.**

CHRISTIAN HENNSSLER,

PA.

41 1/2, 43 1/2 & 43 1/4 Ireland St., PHILA., PA.

HERRING & SWEASEY, Agents in New York, 102 Chambers St.

**McClellan  
File Co.,**  
113 So. Water St.,  
E. Saginaw, Mich.

**TACK-AND-SHOE-NAIL  
MACHINERY:**  
WM A SWEETSER  
Brockton-Mass

**HELLER & BROS., NEWARK, N. J.,**



Manufacturers of the

CELEBRATED AMERICAN HORSE RASPS, FILES, FAR-  
RIERS' TOOLS, AND FINE CAST STEEL.

Made of solid best CLAY CRUCIBLE CAST STEEL of our own manufacture and warranted to be unequalled in the market. For sale by Iron and Hardware dealers throughout the United States and Canada.



**J. M. KING & CO.,**

WATERFORD, N. Y.

Manufacturers of the

**Button's Pat. Wire Cutter and Plier Combined.**

Specially Adapted for Use on Wire Fence.

Also Manufacturers of BLACKSMITHS' and MACHINISTS' STOCKS and DIES, PLUG and TAPER TAPS, HAND, NUT and SCREW TAPS, PIPE TAPS and REAMERS.

Price List on Application.

Established by DANIEL B. KING, 1829.

**LIGGETT SPRING AND AXLE CO., LIMITED,**  
MANUFACTURERS OF  
**Springs and Axles**

For Coaches, Phaetons, Buggies, Wagons, &c.

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**UNION FOUNDRY AND PULLMAN CAR WHEEL WORKS,**

GEORGE M. PULLMAN, President.

CORRESPONDENCE SOLICITED AND ESTIMATES MADE ON

HEAVY MACHINERY, AND ALL SIZES OF FLY WHEELS, PULLEYS, &c.

Special Machinery for Grain Elevators, Grain Steam Shovels, &c., contracted for. Car Wheels and Car Castings at lowest rates.

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STANDARD

**SCALES**

AND

TESTING

MACHINES



Cleveland Iron Ore Paint Co.

MANUFACTURERS OF

PURE IRON ORE PAINTS,

Red (Rouille), Purple and Brown. We guarantee

all our paints, and respectfully solicit the

patronage of consumers and dealers. Our

paints are used largely by the railroads and car builders of our country. Send for Price List No. 15.

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**BEST  
IRON  
PAINT.**



The best general purpose wire fence in use. It is a strong net-work without bars. Don't injure stock. It will turn dogs, pigs, sheep and poultry, and even horses. The fence is good for Farms, Gardens, Stock Ranches and Railroads. Very neat, pretty styles for Lawns, Parks, School-yards and Cemeteries. Covered with rust-proof paint, or made of galvanized wire, as preferred. It is made in a line of sizes, after the boards or barbed wire in every respect. The Sedgwick Gates are made of wrought-iron pipe and steel wire, defying all competition in lightness, neatness, strength and durability. We make the best wire fence in the world, and the most cheap iron fences now made. The best Wire Stretchers, Cutting Pliers and Post Augers. For prices and particulars ask Hardware Dealers.

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EDWARD SUTTON, Eastern Agent.  
300 Market St., Philadelphia, Pa.

**BUFFALO HAMMER COMPANY, Buffalo, N. Y.**  
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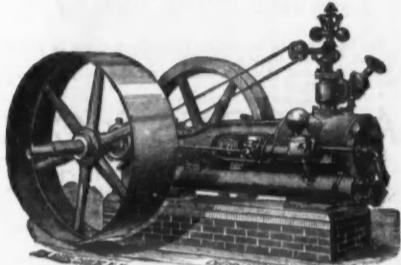
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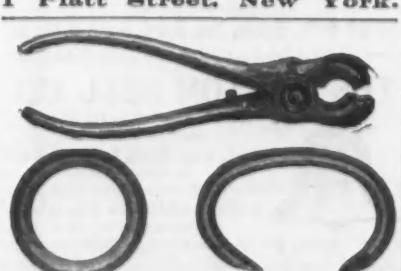


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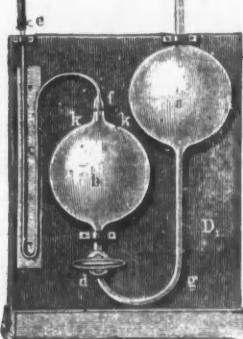
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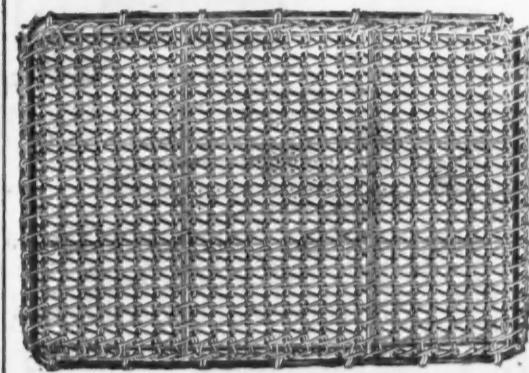
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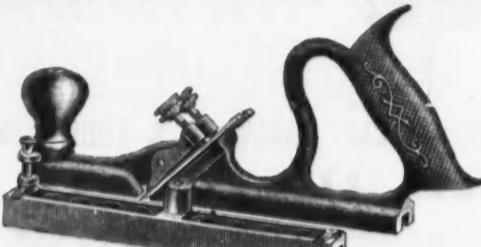
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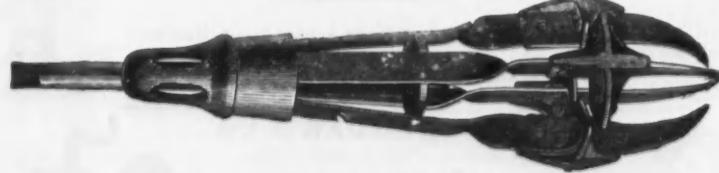
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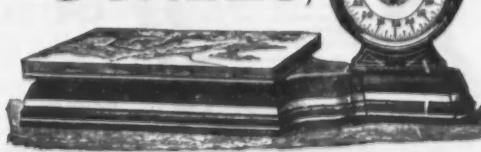
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### The Metric System.

Has the metric system any advantages as compared with our system in the preparation of prescriptions or the practice of the pharmacy? To this query Dr. James V. Ramos answered as follows at a meeting of the Virginia Pharmaceutical Association:

Our Anglo-Saxon education, tradition and practice all seem to demand adherence to that system, which is essentially our own creation, based on experiments and observations, which to this day we have not found reason to change. As Prof. R. Proctor, in his very interesting article on the Great Pyramid, says: "In Great Britain our measures without exception are derived from the daily motion of the stars. Even our measures of the value of money depend upon observed motions of the stars. A grain is the weight of such and such a volume of a certain standard substance—that is, so many cubic inches or parts of cubic inches of that substance. An inch is determined as a certain fraction of the length of a pendulum vibrating seconds in a vacuum at the latitude of London. A second is a certain portion of a mean solar day, and is practically determined by reference to what is called a 'side-real day'—namely, the interval between the successive passages by the same star across the celestial meridian of any fixed place. This interval is assumed to be constant, and is, in fact, very nearly so." The metric system has for its basis certain recent experimental researches which have very lately been found defective, necessitating a possible revision and readjustment of the scheme, since it has been found that the astronomers who surveyed the meridian on which the calculation of the metric system was based have either made errors or incorrect surveys. In regard to the meter, it has been found as the result of more extended deodetic measurements that the meridian quadrant exceeds 10,000,000 meters by about 1850 meters, and that consequently the meter falls short of its definition by its 1.540 part. The kilogram is in like manner found to differ from its assumed value by some small fraction.

Recently we are furnished with a large amount of important evidence in favor of the retention of our Anglo-Saxon system. Prof. O. Oldberg, one of the foremost champions in the advocacy of the metric system, publishes a long and interesting article in the *Pharmacist* (January, 1886), assigning grave reasons why the present system should be preferred to the metric system, because it is so nearly what it ought to be that it would seem to be a grave error to discard it in favor of a system which has been found to be so hazardous, by reason of its unavoidable decimal fractions and decimal points. I have frequently asked engineers if they liked the system, and I will give the answer of one in Berlin. "We use it because we have to, and it is better to have some uniform system than the many measurements that formerly prevailed in the German States. We do not like the metric system, because it has too small a unit, and the meter is too large and involves the use of too many decimals. When we consider the interests involved it will be seen that the population now making practical use of the English standard is greatly in excess of that using by force the French system. I am more confirmed in my opposition to the enforced adoption of the metric system in my country, and firmly believe that those countries that have adopted it are at a disadvantage (as compared with even the most imperfect of our systems)."

America has entered on the line of simplification of its metrology, and that is the direction that should be followed, not by any means giving up what is good, but by making what has been found to be practical better and simpler. The measurements of England and America are on a better basis of accuracy to-day than those of any other country. The editor of the *Western Druggist* (March, 1886), in referring to the article of Mr. Schurrer, in a former issue, on the rise and spread of the metric system in Europe, says: "It illustrates most strikingly that the sentiment against the system in this country is not merely one of languid dislike, but passion in which the voice of practical science is mingled with the echoes of political conquest." His objections to the metric system, *per se*, are pithily expressed in an incidental way in his closing paragraph, when he says, referring to the quite uniform system of weights and measures now in use in this country, with which the learned and unlearned are familiar, that, as possession is nine points in law, so is familiarity nine points in science, and ten in practice. The theoretical merits of the metric system are not in controversy: they may be evident and overwhelming from the standpoint of refined precision, but it must be remembered that people's weights and measures are part of their language, their patriotism and their individuality.

To insist upon the general adoption of the system under these conditions is very much like advising a boy to learn to swim by sprawling in the sand. Enthusiasts here and there have insisted upon employing it in their business, in their conversation and correspondence. How long before their very isolation convinces them of their folly is problematical. Learn to use the metric system, pharmacists are told, but it is safe to use it only when all others concerned are familiar with it. Pharmacists do not recognize in it a necessity, and physicians with few exceptions distrust and avoid it, with good reasons, apparently satisfied with the scruple, dram and ounce, thinking them sufficiently accurate for all practical purposes, and, above all, having the merit of being convenient and universally intelligible. To show the opinion of the druggists and doctors of the United States, Dr. A. C. Matchett tells the *Medical Brief* that a year since he asked for an expression of approval or otherwise of the metric system of weights and measures from the medical profession and the druggists of the United States and found 17 physicians and 31 druggists in favor of the system, and 364 physicians and 2764 druggists opposed to it. The 48 wise men who wish for it have, however, made more noise than all the 6405 who do not want it. Leaving aside all arguments, the majority, as it

seems from the above statistics (and the majority always rule), say stick to the old system. Why try a system that was only made compulsory and used in a country that had such a multiplicity of measures, almost one to each Province, that a general system had to be adopted in order to remedy the evil of varying local standards. Just as well to have adopted our system, for Sir John Herschel has pointed out that the polar axis of the earth is almost exactly 500,000,000 inches, and that the inch may therefore be considered quite as properly a national standard as the meter, and that the desirable correlation between volume and weight may be found in the fact that a cubic foot of distilled water weighs nearly 1000 ounces. By slight changes of the units this relation might be made exact, and the inch become equal to 1,500,000,000 part of the earth's polar axis, 25 of such inches making a cubit equal to the 1,10,000,000 part of the polar radius. We therefore conclude from the weight of evidence presented that we are within the line of safety in adhering to our present system of weights and measures.

### Foreign Markets.

#### FRANCE.

PARIS, June 24, 1886.—**Metals**.—A rather quiet feeling has begun to prevail in our Metal market on the approach of summer, when so many leave the capital. We quote without change: Copper, 102.50 @ 105; Ingots and Slabs, 110; Best Selected, 112.50; and Pure Corocoro Ore, 105. Tin, Banca, 272.50; Billiton and Australian, 271.25; Straits, 270, and English, 267.50. Lead, 32 @ 33.25; and Copper, 37.25 @ 38. Iron.—The market has remained firm on the whole in France, owing to the heavy competition existing there, and down mutually by the Northern ironmasters as regards prices to be maintained, and still further resolutions for strengthening the iron situation are to be submitted at the next meetings to come off at Maubeuge, Saint Dizier, Nancy and in this city. Meanwhile building enterprise is very busy in this city, the demand for Structural Iron active, and prices tending upward in sympathy with the market. The heavy competition existing in Northern France. Dealers here also begin to perceive that old differences and jealousies are better buried and harmonious action substituted for these never-ending squabbles among them; hence prices are being established in this city on a parity with what they are in the North. Coal has been moderately active and firm in view of the Belgian strikes.—*Moniteur des Intérêts Matériels*

#### BELGIUM.

BRUSSELS, June 24, 1886.—Iron.—The position of the Iron market in Belgium remains on the whole favorable, the run for the moment being chiefly on Beams, while other Finished Iron moves off steadily. The only mischief is that in the export trade the depressed condition of the German Iron market causes our makers a very close competition, and they are compelled to sell at lower prices. At home at present, German makers are pressing it for export at almost any price; our makers could not well undertake to compete with them without subscribing to heavy losses on the face of what they would sell abroad; thus they carried the other day the adjudication for a big railroad bridge in Italy at a price which no Belgian maker could deliver it at. Hence the business doing well, especially for domestic use, and Beams are in great demand. Iron for export has been maintained at the same figure as heretofore. Meanwhile the syndicate met again and resolved to prolong the agreement as to prices for another six months; the next meeting is to discuss the proposed reduction of output. But for the timely formation of the syndicate of Belgian makers and the confidence it inspires we would probably be as badly off as our German neighbors. Coal—Is dull and only sustained by the strikes going on.—*Moniteur Industriel*.

#### GERMANY.

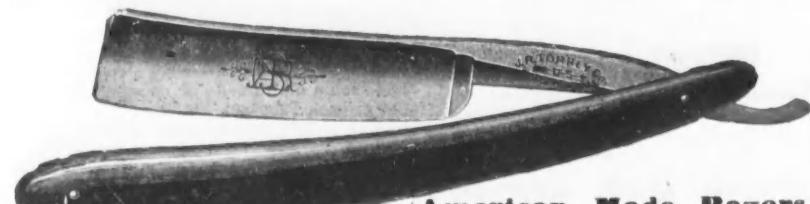
HAMBURG, June 24, 1886.—Iron.—During the week the Iron situation in Rheinisch Westphalia has remained depressed. Buyers of Pig are optimistic and ready to buy on the whole. Spiegel has, however, been raised over the whole. Prices of Pudding Pig have been upheld with difficulty. Sales have, it is true, been effected all the way to September, but the demand as a rule is slack. The Siegen makers intend blowing out three more blast furnaces during coming months. Foundry Pig remains under a cloud, the demand being sluggish at extremely low figures. Thomas and Bessemer are steady. The rolling-mill branch suffered from unprofitableness, for, although Pig Iron is low, the price of Bessemer and finished Iron is comparatively still cheaper. In the Saar-Iron rolling business a few privileged concerns have booked orders for four months to come; the rest, on the contrary, are hard up for work. Nothing has occurred to give life to Wire Rods; these remain dull and depressed. As for railroad material, prospects seem to get daily worse; at late adjudications lower prices than ever have been submitted to. Steel Rails were lately allowed to go to the public at 6.6, and Superior Rubio at 6.4. Shipments to foreign countries are less accepted by makers. Sleepers went comparatively as low. There are complaints throughout from Car works, foundries and machine shops. Few can make both ends meet. Metals unchanged.—*Borsenblatt*.

#### HOLLAND.

ROTTERDAM, June 21, 1886.—Iron.—A large business has been transacted and a further advance established of 1 guilder per 50 kg., carrying Banca to 61.25 and Billiton to 61.—*Koch & Vlierboom*.

#### SPAIN.

BILBAO, June 21, 1886.—Iron.—The market for Iron Ore has been rather quiet; shipments are, nevertheless, steady. Campain Ore is selling at 6.6, and Superior Rubio at 6.3 @ 6.4. Shipments to date 1,495,768 tons, against 1,469,848 in 1885.—*Revista*



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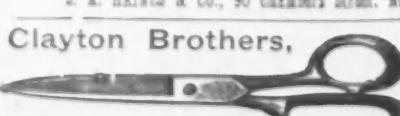
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December 26, 1871.

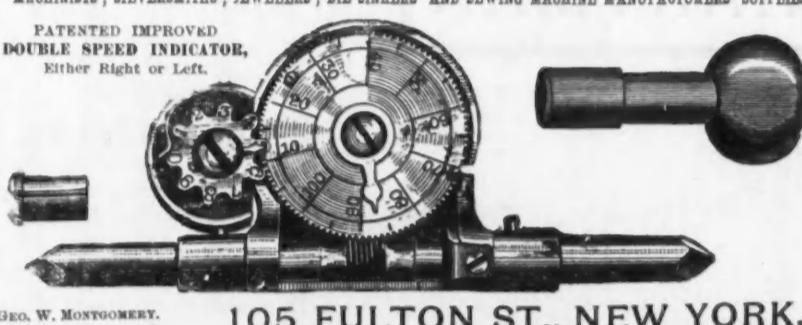
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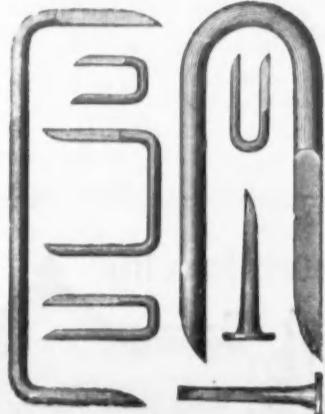
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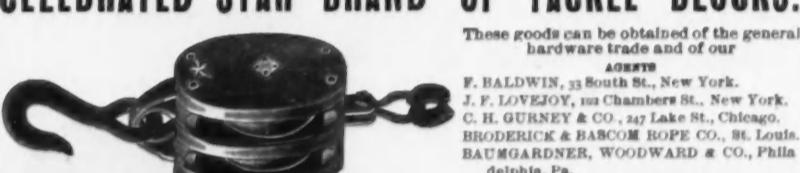
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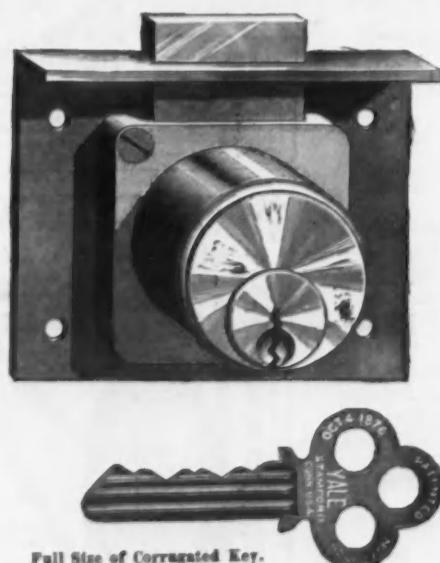
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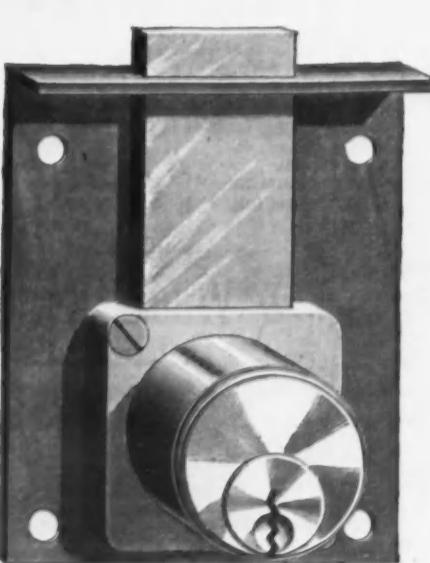
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## THE WEEK.

As illustrating the growth of the dressed beef traffic of Chicago, it may be stated that in 1884 there were shipped from Chicago and from Hammond a total of 498,000,000 pounds; in 1885 Chicago shipped 465,500,000 pounds and Hammond 110,500,000 pounds, making an aggregate of 576,000,000 pounds of beef, or 28,280 carloads of 20 tons each. That number of cars would make a train 180 miles in length.

A strange phenomenon is observed lately in the Alpine and Sub-Alpine regions of Southern Germany. Not only have the pine forests sensibly diminished, but replanting has become remarkably unsuccessful. A new and as yet unexplained agency not only produces gradual decay among grown trees of the most valued conifers, but checks even the most scientific efforts toward replacing the loss thus sustained. This is the case in Bavaria. Within the last few years extensive pine nurseries have singularly failed. Under the most judicious care young trees would take root, grow for a short time, then come to a standstill, linger for a while, and finally die off. This has occurred to such an alarming extent that the forestry department at Munich, at a loss to account for it, has, at least privately, entertained the idea of, so to say, "infusing new blood" into its forests by the introduction of foreign species. Its attention has been turned to India and to the United States, to the Himalayas and to the Rocky Mountains. It is particularly the genera *Abies*, *Pseudotsuga* and *Picea* which are favorably looked upon as fit to become substitutes for and successors to their wanling congeners in the Bavarian Tyrol.

The Peruvian Government will open a mining exposition at Lima, June 1, 1887.

The Government of Ecuador have made a contract with British capitalists for the building of a railroad 139 miles in length and costing \$5,000,000, which Congress is expected to ratify. It is said that the Galapagos Islands have been mortgaged to secure the money required.

The northern or mountainous part of Morris County, N. J., has within a few years become the greatest powder manufacturing center in the United States. The works of the Atlantic Dynamite Co. are at McCainsville, and those of the American Force Co. are at Lake Hopatcong, while the United States Government is building extensive works at Middle Forge for the manufacture and storage of powder. The two first named companies are the largest manufacturers of dynamite powder in the country, and their aggregate production will amount to fully 10 tons a day. At the Atlantic dynamite works, on Friday, the mixing-house, containing 2500 pounds of nitro-glycerine was blown up and 10 workmen lost their lives. A single ounce might have been equally destructive. The company were engaged in filling a contract for 9,000,000 pounds of dynamite for the New York Aqueduct, and several years will be required to complete it.

An electric railway 2 miles in length has been successfully operated in the suburbs of Baltimore for several months. The Daft motor is employed, and as now run two engines take the place of 30 horses and are as cheap. The sections of the conducting rails as well as the track rails are connected by wires. In some places the wires are not insulated, and the rails are connected by a loop of copper wire  $\frac{1}{8}$  inch thick. The connections at the main dynamo are of copper wire,  $\frac{1}{4}$  inch, insulated. At the engine-house there is a boiler 14 feet long and 5 feet in diameter, with 63  $\frac{1}{2}$ -inch flues. The engine is 16 x 24 inches cylinder, which develops about 75 horse-power with 30 pounds of steam, making 110 revolutions a minute. This engine drives two 50 horse-power Daft dynamos, which furnish the current to the middle rail. When both motors, each with a loaded car attached, are ascending the steepest grades, the engine is used to its fullest capacity, but on a level not 10 horse-power is used. This engine uses about  $1\frac{1}{2}$  tons of coal a day in 18 hours, fires being banked at night. Two motors, each weighing about 4500 pounds, of 10 horse-power, are in use. Recently another motor, weighing about 5000 pounds, has been introduced, and is rated at 20 horse-power. The motion of the armatures is about 1200 revolutions a minute, and they are geared to the driving axle of the motor by ordinary tooth-gear wheels, in the proportion of 12 to 1. The speed of the motor has been arranged for 12 miles an hour, but 20 miles an hour can easily be attained.

Local Assembly 116, Knights of Labor, in Philadelphia, composed of stove molders, ignored the settlement of a strike made by the District Executive Board at the stove works of Thomas, Roberts, Stevenson & Co., and the 200 hands are ordered to stay out.

Treasury officials in Mexico assert that the new fiscal year will show a gain of 10 to 15 per cent. in the national revenues, owing to a stricter manner of collection.

The Connecticut River and the streams that make it furnish power to 229 mills. These take 118,026 horse-powers. The greatest number on any one stream are on Miller's River and its tributaries 188, with 7572 horse-powers; the second is Chicopee River and its tributaries, 152 mills, with

14,904 horse power; and the Farmington is third with 178 mills and 8852 horse power. The greatest power, however, is taken from the Connecticut itself, whose main stream supplies 98 mills with 23,366 horse-power.

An examination of the books shows that the Lewiston Cotton Mills, in Maine, have been run 21 years at a net loss of \$1,703,-093.

The new Florida orange crop is carefully estimated at 600,000 boxes. The "freeze" merely demonstrated in what sections of the State the business can be profitably followed.

A pamphlet setting forth in glowing hues the resources of British Columbia has been widely disseminated in the interest of the Canadian Pacific Railway, from which it would appear that there is room for the profitable employment of millions of money, with innumerable chances of creating business. Coal and iron are among the attractions.

Ex-Gov. Alex. R. Shepherd, who is at the head of a mining company in Chihuahua, writes to a Member of Congress respecting the Mexican treaty, as follows: "It is true that the present Mexican tariff (like that of the United States) is in many respects oppressive and burdensome, but it is also true that efforts are constantly being made by the Government to adapt it to the necessities of trade, and it cannot be doubted that a proper spirit manifested by the United States Government would be met more than half-way by the Government of Mexico, and permanent good result to both countries." Mr. Shepherd, after a residence of seven years in Mexico, says, further, that the person and property of an American pursuing the peaceful advocacy of industry and commerce are as secure in Mexico as in any part of the United States.

An over-issue of certificates of loan by Treasurer Wilson and his official predecessor in the Chesapeake and Delaware Canal Co., to the extent of \$600,000 and upward, creates a feeling little short of consternation among financiers in Philadelphia. The president of the company states that until a full examination is made and all the certificates are shown it will be impossible to make any definite statement. Whether the genuine and fraudulent certificates can be separated from each other is not known yet, but the belief is strong that no distinction can be made that will relieve the company's responsibility.

Traffic on the canals since the opening of navigation has increased remarkably, especially bearing in mind the labor disturbance at Chicago, one of the principal shipping points in the West. The official statement shows a tonnage in May and June amounting to 1,507,433 tons, as against 1,189,012 tons during the corresponding months last year. Increase for 1886, 318,521 tons, which, on a basis of a seven months' canal season, would indicate an increased tonnage for the year of over 1,250,000 tons. The increase is mainly in wheat and iron ore. The shipment of corn is materially decreased because of the threatened heat in the supply in the warehouses.

The Law and Order League, which organized at Sedalia, Mo., with the design of preventing labor disturbances, is now said to have a membership of 17,000, mostly in St. Louis.

Cotton in the South has been injured by too much rain, and corn has suffered.

The total output of the Eau Claire lumber regions in Wisconsin this year will probably reach 450,000,000 feet, considerably exceeding that of last year.

A seat in the New York Stock Exchange is equivalent to a competency for life. Any one of the 1100 members has an opportunity to make money surely and easily by means of the exclusive privileges granted to those who have the right of the floor. Many of the members are never seen at the Exchange, however, and the appearance in person of a heavy operator like Cammack among the regular manipulators and scalpers is a kind of sensation. The price of seats varies greatly. Last week, for instance, a seat sold for \$27,000, which is \$5000 less than was paid six years ago for it.

George W. Porter, secretary of the Baltimore Board of Trade and connected with the commercial interests of that city for many years, died July 5.

The salmon catch on the Columbia River turns out almost as well as a year ago.

A brisk trade is springing up in River Plate frozen mutton, which promises in a few years to rival the wool business. According to the British Board of Trade returns, the arrivals in Great Britain from Buenos Ayres in three months ending March 31, 1886, were 30 per cent. of the total.

Massachusetts will have a State Board of Arbitration, the three members to be appointed by the Governor.

Two steel Clyde-built steamships will be bought in England shortly for the Red Star Line.

The arrivals in New York of vessels from foreign ports during the month of June numbered 599, of which 252 were British steamers, while of the arrivals of American vessels, comprising 200 in all, 146 were

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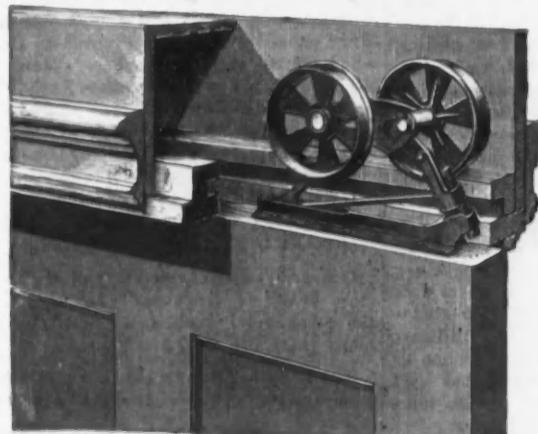
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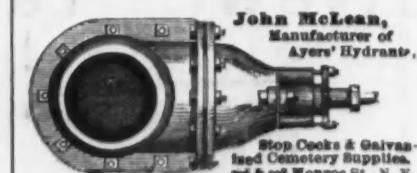
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AND METALLURGICAL REVIEW.

New York, Thursday, July 8, 1886.

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 JAMES C. BAYLES, - - - Editor.  
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## REMOVAL.

The office of this journal is removed to 66 and 68 Duane Street.

## The Business Outlook.

R. G. Dun & Co.'s circular of record and prophecy, bearing date of July 1, is a document well calculated to create a hopeful feeling in business circles. Primarily it shows a falling off in the number of failures during the first half of the present year, as compared with the first six months of last year. The comparison is as follows:

## First Six Months.

	1885.	1886.
Failures.	5,156	6,004
Liabilities.	\$50,434,460	\$74,723,355

This favorable showing may be accounted for in several ways. During the long period of business depression through which we have passed, the financially weak and badly managed concerns have mostly gone to the wall. Few wildcat or speculative ventures have been started, and it is probable that, should depression continue indefinitely, the number of failures would grow less and less each year. In a word, the times through which we have passed are not such as promote numerous or heavy failures, since they invite caution and a close scrutiny of credits. It will not do, therefore, to predicate too much upon the fact that there have been fewer failures since January 1 than were reported during the same period last year. More than anything else it shows that there has been no revival of business activity and no extension of commercial credits. Of the future the circular says:

There appears to be a better adjustment of values prevalent than for some years past, offering surer opportunities for a profit in the transaction of business. A certain settled standard has succeeded the shifting, unknown basis which has hitherto prevailed, and is a powerful aid to the establishment of the confidence now being gradually restored. The earning power of large corporations, whose securities are held widely throughout the country, such as railroads, manufacturing concerns, banking and other representative institutions, is now apparently more assured than at this time last year. The steady improvement in the railroad situation is the best indication in this direction, reports showing not only an increased tonnage, but at rates that yield fair returns. A more certain income for a large class of security holders may therefore be relied upon, and a more settled condition of trade

among this class is thereby rendered possible. There is a great increase in the class of security holders, and the number of people in the United States who now live upon the interest of their investments and loans has of late years enormously increased. Whatever contributes to permanency and certainty of income for this class helps general trade now to a greater extent than ever before. Hence the cessation of the great railroad wars, which last year were so destructive of values, is of importance as indicating that the immense capital invested in this means of communication is now likely to earn a fair return, a matter of great importance to the general trade of the country.

The growth of wealth and money-earning capacity of this vast country in the last few years is illustrated by the gradual decline in the rate of interest, the consequences of which are likely to be very important. The rates now prevalent of 4 or 5 per cent. are almost as universal as five years ago were 6 and 7 per cent. This cheapness of money, while on the one hand it indicates a great abundance and an approach to the monetary conditions which prevail in the wealthiest countries of the Old World, is likely on this new continent to have most important consequences in the extension of undertakings impossible in countries less in size and with restricted resources. This cheapness of money, with confidence restored and a fairer prosperous condition of affairs existing throughout the country, is likely to stimulate all new enterprises, while the economy with which business can now be transacted, owing to the low rates which prevail, is full of encouragement for the future.

It would be difficult to imagine a more favorable set of conditions than those now prevailing, and, except for the high taxation, which Congress has thus far failed to reduce, and its failure to pass a bankrupt law, so that uniform action for the protection of debtor and creditor could be secured, there is little that needs to be done to offer the best possible chance to the trader, the manufacturer or banker to pursue a profitable and satisfactory career. With failures as few, notwithstanding adverse conditions, with the country growing rapidly year by year, with money at low rates of interest, and with few disturbing elements, there seems fair reason to anticipate a prosperous autumn business.

Much of this is exaggerated and misleading; some of it is quite true and proportionately reassuring. The railroad quarrels in the West are by no means settled, and nothing in the present situation gives assurance of a permanent increase of income for the holders of these securities. We also fail to see in what consists the present assurance of better earnings and larger dividends for manufacturing corporations. The cheapness of money is due to the fact that there is but little demand for it, and a stagnant money market always indicates stagnation in general business. Undoubtedly there are many encouraging indications in the situation, but they are not enough to warrant extravagant predictions in the near future.

We are quite willing to admit that the indications warrant the belief that the tendency is in the direction of improvement, but it is of the utmost importance that all efforts to create an exaggerated idea of the present and prospective activity of trade be discouraged. There was very little real ground for the rooseate prophecies which ushered in the present year, but these prophecies defeated their own object. They created in the minds of the working classes the impression that a tidal wave of prosperity had overtaken the country, and that labor was wronged in being refused the chance to discount the promise of the future in immediately increased wages. The result was a succession of strikes and disturbances unparalleled in the history of the country. The promise of the year was blasted, and labor is not so far instructed by the teachings of experience that the experiment can safely be repeated. It is also well to remember that there is a vast amount of money lying idle waiting for a chance to make a profit in speculation, and that anything calculated to encourage a "boom" cannot but be productive of disaster. If we are on the eve of better times, let us approach them cautiously and with as little excitement as possible. Under present conditions a boom would be short-lived and its results deplorable. For this reason we deprecate any attempts to make the situation appear better than it really is. There is nothing to gain by such a course and much to lose.

## Imports of Iron and Steel for the First Five Months.

The official import returns, including the month of May, just issued, do not on the whole show any movement of special significance. We tabulate below the figures covering the first five months of the calendar years 1885 and 1886, and those giving the total for the first 11 months of the fiscal years ending April 30:

## Imports of Iron and Steel.

Articles.	First 5 mos. Calendar yrs.		First 11 mos. Fiscal years.	
	1885.	1886.	1886.	1885.
Iron ore.	421,437	143,517	624,195	381,359
Pig iron.	9,628	9,596	5,591	4,306
Iron scrap and old iron.	35,190	5,654	42,817	19,361
Steel scrap.	9,628	9,596	5,591	4,306
Bar iron.	9,260	7,150	30,779	30,386
Steel rails.	9,200	1,632	9,464	4,127
Cotton ties.	244	2,659	18,662	14,656
Band, hoop and scroll iron.			113	356
Sheet, hoops, bands, strips, sheets and plates.	882	525	2,088	1,041
Steel ingots, blooms, slabs, billets and bars.	36,321	8,862	55,216	16,659
Sheet, plate and tapers iron.	1,798	712	5,796	5,881
Tin plates.	119,361	90,683	226,415	204,824
Wire rods.	75,860	34,894	125,987	108,811
Wire and wire rope.	1,329	657	2,736	1,570
Anvils.	437	218	725	548
Chains.	298	206	587	559

The total values of the imports of iron and steel for the first 11 months of the fiscal years 1885 and 1886 respectively were \$33,463,377 for the latter, against \$30,909,582

for the former. This includes the following items not enumerated in our table given above, which covers only tonnages:

Eleven months— fiscal years.		
1885.	1886.	
1,511,613	1,321,127	
44,081	44,187	
709,880	1,006,987	
1,085,205	882,650	
300,694	307,308	
1,297,145	1,652,103	

A glance at the table of tonnages shows a continuance of the heavy importing movement in iron ore, in pig iron, steel blooms and billets, and iron rods. Scrap iron was still coming in large quantities in May, and we know of lots from distant countries now afloat for this market on a speculative venture. Ore has been more active of late, and there is a decided growth in the business in making Bessemer pig from foreign raw material in the East, a number of furnaces having already changed or being about to change. It should not be assumed, however, as is largely done, that all the ore imported is used for making Bessemer grades of pig iron. A number of Eastern furnaces are employing it in admixture with domestic ores and mill cinder in the manufacture of other grades. Pig iron so made is selling at about \$18 at furnace, while foreign pig is not quoted at tidewater lower than \$18.75. Until now the large shipments of Bessemer pig from England have had the effect of keeping freights from Glasgow comparatively high, thus making the importing price of Scotch foundry irons higher than they would otherwise be. In other directions there is nothing worthy of special mention in the import trade.

## A Departure in Water Heating.

In a paper entitled "Flame Contact—A New Departure in Water Heating," Mr. Thomas Fletcher, the well-known English investigator, recently presented to the British Gas Institute particulars which in various shapes have for some time past excited the interest of engineers and scientists generally. Mr. Fletcher undertook to prove on theoretical grounds, and also by experimental demonstration, that the present accepted system of water heating by gaseous or other fuel is a very imperfect means for an end, and is, both in theory and practice, essentially faulty. Directing attention to the well-known fact that it is impossible to obtain flame contact with any cold or comparatively cold surface, as, for example, the heating surface of a steam boiler, and noting the consequent waste of heat counteracted in a measure by an extension of surface in contact with the water, he proposed to supply water-heating vessels with a number of rods (copper rods in the case which he specially illustrated) depending from the lower surface, each rod passing through into the water space, and being flattened into a broad head which would give up its heat rapidly to the water. Mr. Fletcher's theory can be stated in a few words. The lower ends of the rods, not being vertical, and noting the consequent waste of heat counteracted in a measure by an extension of surface in contact with the water, he proposed to supply water-heating vessels with a number of rods (copper rods in the case which he specially illustrated) depending from the lower surface, each rod passing through into the water space, and being flattened into a broad head which would give up its heat rapidly to the water. Mr. Fletcher's theory can be stated in a few words. The lower ends of the rods, not being vertical, and noting the consequent waste of heat counteracted in a measure by an extension of surface in contact with the water, he proposed to supply water-heating vessels with a number of rods (copper rods in the case which he specially illustrated) depending from the lower surface, each rod passing through into the water space, and being flattened into a broad head which would give up its heat rapidly to the water. 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blast on the 15th of this month. It will then have a capacity of 450 tons weekly. We estimate the June product of this district at 36,925 tons, as compared with 39,494 tons in April and about 40,000 tons in May.

Adding the product of the one furnace in Maryland we reach a total for the anthracite furnaces of 161,281 tons for June. This carries the make for the quarter—April, May and June—to 408,525 gross tons. The product for the first half of the year 1885 was only 627,872 gross tons, and of the second half 670,600 tons, so that, estimating the make of the first quarter at 408,000 tons, from former capacity statistics, it is clearly evident that in making about 876,525 tons in the first six months, we are now turning out iron at a heavily increased rate. It may be stated, however, that much of the apparent reserve capacity cannot be made available at present prices. It embraces, of course, the usual number of furnaces really only out of blast temporarily for repairs or alterations. There is no room, therefore, for any marked increase unless a larger number of furnaces turn to the use of a greater proportion of rich foreign ores.

On the first of July there were 132 coke and bituminous furnaces in blast, having an estimated weekly capacity of 71,266 gross tons, as compared with 129 furnaces and 70,766 tons capacity on June 1, and the same number, with 67,888 tons capacity, on May 1. In the Shenango Valley the Ella blew in on the 15th of June. Among the furnaces which have made a good record recently is that of Messrs. Raney & Berger, which in May made 3534 tons and in June, in 26 days, 3354 gross tons. The total June output of the district was about 31,659 gross tons, as compared with 28,916 tons in May and 30,135 tons in April. In the Juniata and Conemaugh valleys the same number of furnaces are blowing. The aggregate June make may be placed at 23,361 tons, as compared with 23,581 tons in May and 23,547 tons in April. In the Youghiogheny Valley the Lemont Furnace has blown out, thus reducing the number of active furnaces temporarily to three. In the Pittsburgh district Lucy No. 1 and Isabella No. 2, which were out for the purpose of relining and for other repairs, have blown in again. The fires were lighted in the Edith Furnace several days ago, and it will blow in shortly. Then every furnace in Allegheny County will be in blast with the exception of one of the Shoenberger furnaces.

In Ohio we have in the Mahoning Valley the same furnaces blowing, and the output was 30,734 tons in June, as compared with 31,533 tons in May and 29,785 tons in April. In the Hocking Valley the Gore Furnace has again gone into blast, after having put up a new casthouse, and the Fannie, which was in operation only one week during the month, blew in again on the 30th ult. The June output was about 885 tons, including the Franklin and the Zanesville furnaces, as compared to 8310 tons in May. In the Hanging Rock region there have been few changes.

From our returns we estimate the total make of the bituminous and coke furnaces of Pennsylvania at 118,500 tons in June, as compared with 111,221 tons in May and 108,323 tons in April. In Ohio the stacks in blast in June produced about 69,355 tons, against 72,875 tons in May and 73,834 tons in April. In Illinois the same furnaces were running, and the same is true of Indiana, Missouri and Wisconsin.

In the Southern States, one of the furnaces in Virginia, the Lynchburg, went out on the 13th for repairs. The Princess, which was out of blast on the 1st, has probably blown in again as we write. We estimate the June product at 10,797 tons, against 10,466 tons in May. In West Virginia there have been no changes, the June output being 9585 tons, against 9456 tons in May. In Kentucky the same three furnaces are running. They produced a little more in June than in May, viz., 4073 tons, against 3880 tons. In Tennessee seven out of the 10 furnaces made 9117 tons. One of the Rockwood stacks was banked during a part of the month, and a number of the other plants have not produced up to full capacity during the month. The May product was 11,983 tons. In Alabama one of the Sloss furnaces has gone out for the purpose of changing its lines to conform with those of No. 2, which has been eminently successful. The product during the month was about 12,000 tons, against 14,935 tons in May.

The charcoal furnaces show little change. In Maryland the Muirkirk Furnace is out and will probably remain in that condition during the balance of the year. The Stickney Furnace was banked temporarily on the 20th of June. In Virginia the Walton went in on the 14th, and after it has completed its run the White Rock Furnace will blow in. In Michigan the Eureka began to make pig iron on the 20th. We estimate the yield of all the Michigan furnaces in June at 13,892 gross tons. In Wisconsin the Appleton, Mayville and National made together 228 tons. In Missouri two furnaces produced 1913 tons.

The *Railway Age*, of Chicago, has issued its usual semi-annual statement on the railroad construction during the first six months of the current year. This compilation, evidently made with much care, places the new mileage on 97 different roads at 1755 miles. It should be specially noted that generally only about one-third of the mileage of the entire year is completed during

the first half of the year. Last year, when 3200 miles were laid, the extension of track reported to the 1st of July was a little more than one-half of that put down this year. Our contemporary feels justified on the strength of its returns to predict that the total extension of our railroad network in 1886 will not fall short of 6000 miles, "and may considerably exceed that." The *Railroad Gazette*, which weekly publishes a record of new railroad construction, has the following comparative figures in its last issue, to which we have added the annual additions of mileage, according to Poor:

	Six months.	Year.
1886.	1,376	...
1885.	584	3,300
1884.	1,313	3,225
1883.	2,109	6,738
1882.	4,415	11,566
1881.	2,281	9,789
1880.	2,190	7,174

These figures do not indicate quite so heavy an increase, unless indeed fully 400 miles this year escaped the attention of the *Railroad Gazette*. We must leave our two contemporaries to settle that question, content to know that, so far as indications go, our iron and steel works will be called upon to deal with the furnishing of supplies for about 6000 miles of new road during the current year. A good deal of this, notably so far as steel rails and track materials are concerned, is already contracted for and largely delivered. But a good deal of the rolling stock and other supplies has not yet been bought, and the next month or two will probably bring out much of it. The first indications of this movement have lately come from the West, and are a promising feature for the near future.

It is not surprising that the Ways and Means Committee have reported adversely on the tariff bill introduced by Mr. Randall, but it is to be regretted that this disapproval extends to all the provisions and includes the desirable features of Mr. Hewitt's bill to reform the administration of the customs laws. The only chance now offered of securing the consideration of Mr. Hewitt's bill is in his obtaining unanimous consent for its consideration as a separate measure, which it is doubtful if he will obtain. The same result could be reached by calling up the Morrison bill, and moving to strike out everything except the administration clauses. This, however, presents serious difficulties, and it is probable that tariff legislation, good or bad, is at an end for this session.

#### The Dephosphorization of Iron in the Bessemer Converter.

To the Editor of *The Iron Age*: A short time ago *The Iron Age* published the results had at Creusot from the use of fluor spar for the dephosphorization of iron in the Bessemer converter, which were successful when the iron was high in silicon, but when it contained from 0.60 to 1 per cent. of silicon it was difficult to use, owing to the formation of skulls. The reason then given for this fact was that the phosphorus was oxidized or burnt before the carbon, and its heat lost by so doing. This is easily proved by a mistake, as phosphorus in burning evolves 5.747 units of heat per pound when burned with air, and the heat with that of the silicon would be more than that in the acid process when pig containing 1.75 per cent. of silicon is used.

The facts are that with pig iron in acid process containing 1.75 per cent. of silicon, yielding 39 pounds of silicon per ton of iron, each pound of silicon in combustion with air gives 7830 heat-units, or 300,370 heat-units per ton. As this is the lowest normal condition of iron used in the acid process except when it also contains manganese, it follows that in order to obtain this heat means must be used to secure it in any other process when the carbon is the same in either case. The Creusot metal averaged 0.80 per cent. of silicon, of which only one-half was oxidized, yielding 9 pounds of silicon or 20 pounds of silica, which, at 7830 units of heat per pound of silicon, gives 70,470 heat-units. The report says that 80 pounds of fluorspar sufficed for the operation, the resulting metal containing 0.052 per cent. of phosphorus and the slag 18 per cent. of phosphoric acid, the phosphorus in the pig being 2.1 per cent., or about 50 pounds per ton of iron. The other half of the silicon was converted to fluoride of silicon, which does not add to the heat of the metal, so that 9 pounds of the silicon were oxidizable and thus contribute to the heat of the metal. This thus becomes 20 pounds of silica, and the 80 pounds of fluorspar are converted to 58 pounds of lime. Any metallurgist will see that only about 130 pounds of slag are formed, including the phosphoric acid, which is equal to 10 pounds of phosphorus at 18 per cent. of phosphoric acid. This 10 pounds of phosphorus in oxidizing at 5747 units of heat per pound yield then 57,470 heat-units, and the heat-units of 9 pounds of silicon give 70,470 heat-units, the aggregate being 127,940 heat-units, or 170,430 heat-units less than is required in the acid process, wherein no phosphorus is oxidized. Therefore, in order to make up this deficiency of heat about 22 pounds of silicon per ton of iron more are required to make the iron hot enough to pour without skulls. This is confirmed by the Creusot experience with iron rich in silicon.

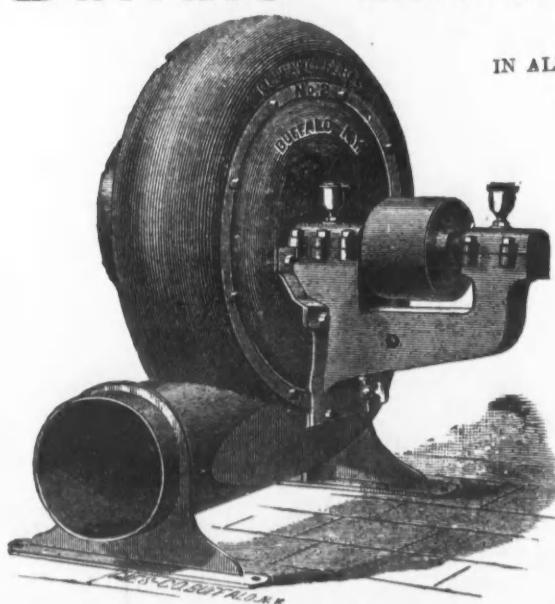
I patented the process of using more silicon treated by blasts of air in the converter lined with a basic lining to desilicize the iron, and pouring off the silicious slags formed thereby, and then treating the metal with fluorspar to remove the phosphorus. By this means all of the silicon is oxidized and used for heat, so that metal with less silicon than is required in the acid process may be used. Thus iron containing 1.4 per cent. will be suitable. As but 10 pounds of phosphorus are found in the slags per ton of iron, the remainder, exclusive of that left in the steel—about 1 pound—say 39 pounds, has been vaporized, as there is no

#### Condition of the Blast Furnaces of the United States, July 1, 1886.

#### Compiled for The Iron Age.

Location of Furnaces.	Charcoal.				Anthracite.				Bituminous or Coke.				
	Total number of stacks.	Number reported in blast.	Capacity per week.	Number reported out of blast.	Total number of stacks.	Number reported in blast.	Capacity per week.	Number reported out of blast.	Total number of stacks.	Number reported in blast.	Capacity per week.	Number reported out of blast.	
New England . . . . .	14	6	610	8	326	21	1,144	13	2,672	14	13,875	2	1,175
New York . . . . .	10	3	450	7	570	34	13	3,875	21	5,885	0	0	0
New Jersey . . . . .						16	5	2,313	11	3,162			
Spiegel . . . . .						3	2	135	1	90			
Pennsylvania . . . . .	27	9	457	18	418								
Lehigh Valley . . . . .						50	37	11,144	13	2,672			
Spiegel . . . . .						1	1	40	0	C			
Schuylkill Valley . . . . .						45	22	6,851	23	4,975	1*	1	775
Upper Susquehanna Valley . . . . .						20	13	3,486	7	1,350			
Lower Susquehanna Valley . . . . .						38	23	8,618	15	2,235			
Pittsburgh . . . . .										16	14	13,875	2
Spiegel . . . . .										1	1	450	0
Allegheny Valley . . . . .										2	1	525	1
Shenango Valley . . . . .										23	14	7,785	9
Youghiogheny Valley . . . . .										6	3	1,125	3
Juniata and Conemaugh Valleys . . . . .										20	13	5,451	7
Spiegel . . . . .										1	1	250	0
Maryland . . . . .	13	2	230	11	647	4	1	300	3	440	2	1	90
Virginia . . . . .	24	3	147	21	970					6	4	2,655	2
North Carolina . . . . .	2	1	120	1	190					17	12	7,139	5
West Virginia . . . . .	3	0	0	3	165					17	11	5,425	6
Ohio—Mahoning Valley . . . . .										17	8	2,090	9
Central, Eastern and Northern . . . . .										15	9	1,515	6
Hocking Valley . . . . .										3	3	951	0
Hanging Rock . . . . .										10	7	2,127	3
Miscellaneous . . . . .	17	6	528	11	685					2	2	1,015	0
Kentucky . . . . .	3	2	235	1	125					10	7	3,512	3
Tennessee . . . . .										2	2	417	0
Georgia . . . . .										16	9	9,430	7
Alabama . . . . .	2	0	0	2	150					2	0	0	2
Indiana . . . . .	11	8	2,100	3	375					2	1	675	1
Illinois . . . . .										17	8	2,090	9
Michigan . . . . .	25	13	3,441	12	2,275					16	9	2,870	7
Wisconsin . . . . .	10	4	700	6	532					17</td			

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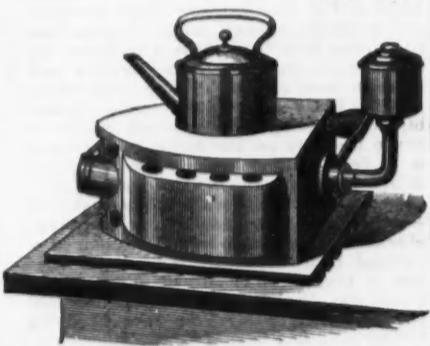
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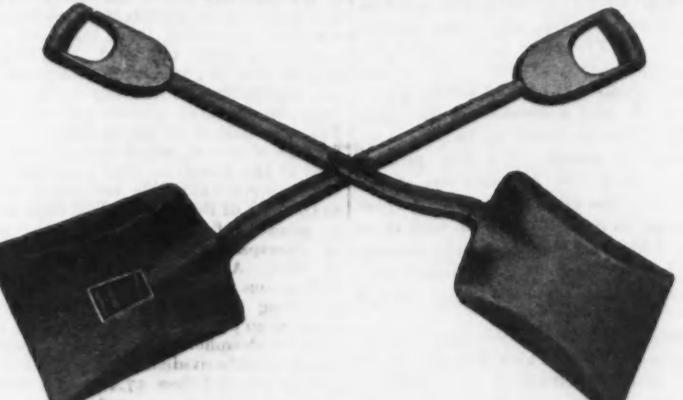
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**Anglers and Bits.**  
Bridgeport Gun Implement Co., Bridgeport, Conn. .... 9

Jennings C. E. & Co., 90 Chambers, N. Y. .... 2

New Haven Copper Co., 254 Pearl, N. Y. .... 2

**Axles, Springs, &c., Manufacturers of.**  
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Liggett Spring & Axle Co., Pittsburgh. .... 34

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Mann W. Jr. & Co., Lewistown, Pa. .... 10

Peck A. G. & Co., Cohoes, N. Y. .... 44

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Hawk Eye Steel Barb Fence Co., Burlington, Conn. .... 2

Iowa Barb Wire Co., 90 Reade, N. Y. .... 2

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**Bellow, Manufacturers of.**  
Bullock T. B., Cleveland, O. .... 16

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Penfield Block Co., Lockport, N. Y. .... 11

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Davol John & Sons, 100 John, N. Y. .... 22

Holmes, Baush & Haydens, 20 Park Place, N. Y. .... 2

Plumb & Atwood Mfg. Co., 18 Murray, N. Y. .... 2

Scoville Mfg. Co., 421 Broome, N. Y. .... 2

Waterbury Brass Co., 296 Broadway, N. Y. .... 2

**Brass Butt Hinges.**  
Tiebold W. & J., 16 & 18 Chambers, N. Y. .... 24

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**Can Screws.**  
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**Car Axles.**  
Roberts A. & P. & Co., 265 S. 4th, Phila. .... 5

**Car Wheels.**  
Knoxville Car Wheel Co., Knoxville, Tenn. .... 35

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Whitney A. & Sons, Philadelphia. .... 5

**Carbons.**  
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Cleveland Hardware Co., Cleveland. O. .... 37

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Smith B. D. & Co., Plantsville, Conn. .... 12

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**Castings, Iron.**  
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Devlin & Co., Philadelphia, Pa. .... 7

Fight & Clark, Albany, N. Y. .... 10

Harrington & Co., Branford, Conn. .... 10

North Brothers, Philadelphia, Pa. .... 10

Springfield Fury, Co., Springfield, Mass. .... 33

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Gridley & Co., 57 Maiden lane, N. Y. .... 12

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**Corrugated Iron.**  
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Moseley Iron Bridge & Roof Co., 5 Dey, N. Y. .... 4

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Western Electric Co., Chicago, Ill. .... 2

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## Special Notices.

**BOOKS.**

## THE NEWEST BOOKS.

British Iron Trade Report on the Home and Foreign Iron and Steel Industries in 1885. \$2.

Oils and Varnishes. By JAMES CAMERON. \$1.75

Elements of Inorganic Chemistry, Descriptive and Qualitative. By J. H. SHEPARD. \$1.25

Flax, Tow and Jute Spinning; A Hand Book Containing Information on the Various Branches of These Trades; second edition. By P. SHARP. \$2.

Treatise on Statics, with Applications to Physics; third edition, corrected and enlarged. By G. M. MINCHIN. \$4

Practical Hydraulics; a Series of Rules and Tables for the Use of Engineers. 7th Edition. By THOMAS BOX. \$2

A Handbook on the Teeth of Gears; Treating of the Form of the Gear Tooth; Explaining the Different Curves in use. Their Theory, Peculiar Properties, mode of Operation, Strength and Horse Power and Practical Construction. By G. D. GRANT. \$1

The Bridle Bits; A Treatise on Practical Horsemanship. By Col. J. C. BATTERSBY. \$1

The American Salmon Fisherman; With Illustrations and Map Showing Location of Salmon Rivers. By H. P. WELLS. \$1

The Labor Problem; Plain Questions and Practical Answers. Edited by W. E. Barnes. A Compilation of Articles Containing the Views of Manufacturers, Workmen, Divines, Labor Commissioners, Journalists and others. \$1

Modern Cottages; Contains 125 illustrations of Cottages, Dwellings, a d Miscellaneous Work. By J. H. KIRBY. \$4

The Indicator; A Practical Work for Engineers. By F. T. HEMMENWAY. \$2

Warm-Blast Apparatus for Transferring a Part of the Heat of Escaping Flue Gases to the Fu-nace. By J. C. HOADLEY. \$1.50

Any Book Published will be sent, postpaid, to any address on receipt of price by

**DAVID WILLIAMS,**  
Publisher and Bookseller,  
66 and 68 Duane Street, New York.

An Unusual Opportunity for a Good Business Manager.

A party having the general management of a large Iron and Wood working establishment located in the city of Boston, desire to sell a portion of his interest in said corporation to a man qualified to fill his position; only a man of sufficient business experience need apply. Special qualifications needed are in manufacturing line, as selling department is well handled. Business is well protected by patents. Anywhere from \$30,000 to \$40,000 can be invested in stock that has paid \$20 per annum on the average for past nine or ten years. The ill-health of owner is the reason for selling. Business very snug; no long credits.

Address "D. E. F."

Office of The Iron Age, 66 and 68 Duane Street, N. Y.

**Forty-Two Inch Lathe**  
AT A LOW PRICE.

Having purchased at a low price, from a well-known builder of Machine Tools, a lot of Patterns and Tools partly finished, we are enabled to offer a **Forty-Two Inch by EIGHTEEN FEET TREBLE-GEARED LATHE** at a figure considerably less than its cost to build it.

It is the only one we shall have to offer at this figure. It is of excellent design, strong and well proportioned.

THE

**NEWARK MACHINE TOOL WORKS,**  
NEWARK, N. J.

**SECOND HAND,**  
CHEAP.

One 12 ft. bed, 42 in. Engine Lathe.  
One 12 ft. bed, 36 in. Engine Lathe.

One 6 ft. bed, 28 in. Engine Lathe.

One 6 ft. bed, 18 in. Windsor Lathe and Chuck fitted.

One Profiling Machine.

One No. 3 Brown & Sharpe Screw Machine.

One 2-spindle Pratt & Whitney Drill.

One Four-spindle Garvin Drill.

One Four-spindle Machine Co. Milling Machine. Lincoln Pattern.

One 2-in. Pipe Threading and Cutting Machine.

Send for List of Second hand Tools.

**New York Machinery Depot,**  
Bridge Store No. 10, on Frankfort St.,  
New York.

**FOR SALE.**

1600 lb. 3½ in. x 1½ in. Cant Hook Steel.

1400 lb. 1½ in. " "

Lot left after finishing a contract. Will sell low.

BEECHER & PECK,

New Haven, Conn.

**FOR SALE.**

A first class manufacturing property completely equipped for the manufacture of either metal or woodwork, and with a natural gas well but a few hundred feet away. The property is located on one of the great trunk line railroads, and adjoining the factory so that material and supplies or finished goods is necessary. For further particulars, please address

"MANUFACTURING PLANT,"

Office of The Iron Age, 66 and 68 Duane St., New York.

**WANTED.**

A young, active man, experienced in Builders' Hardware, was formerly an old-established house in Chicago. Capital required for a one-third interest, \$10,000. Address with full information as to present and former engagements, in strict confidence.

"LOCKS,"

Office of The Iron Age, 38 Clark St., Chicago, Ill.

## Special Notices.

**SPECIAL NOTICE****TO MANUFACTURERS.****THE CALUMET & CHICAGO CANAL & DOCK CO.,**

The largest land owners at SOUTH CHICAGO and in the Calumet Region, offer on liberal terms

**SITES FOR FACTORIES,**

Lots or acre property on river and railroad, connecting with the B. & O., Chicago & Atlantic, Chicago & E. Illinois, Chicago, R. I. & P., Chicago & W. Indiana, and Belt Line, Ill. Cent., L. S. & Mich. So., L. N. Albany & Chicago, Mich. Cent., N. Y., Chicago & St. Louis and P. Ft. W. & Chicago Railroads.

Number of passenger trains to Chicago from South Chicago daily is about 75 each way.

Also Docks on Calumet River, with its splendid harbor at South Chicago, and the only river property connecting with the Belt Line, which also connects with every R. R. entering Chicago.

**Towage One-Half Chicago Rates.**

Capital invested at this point alone, \$9,000,000.00

In buildings and plants, - 4,100,000.00

Value of product last year, - 9,000,000.00

Lumber received last year, - 105,000,000 ft.

Among the many large establishments already located are the North Chicago Rolling Mill Co.'s Bessemer Steel Rail Mill, the Calumet Iron and Steel Co.'s Rolling Mill and Nail Manufacture, The Morden Frog and Crossing Works, Chicago Forge and Bolt Works, &c. &c.

**MANUFACTURERS, or shippers of COAL,****PIG IRON, IRON ORE LUMBER, ETC.**

etc. parties who wish to build **BRIDGE** **ELEVATORS** etc. please correspond with us.

Contractors for River and Harbor Improvements, Dredging Dock and Pier Construction, Pipe Foundations, etc. Estimates on application.

Office, 179 Dearborn Street, Chicago.

**METALLURGICAL ENGINEERING.**

I am prepared to furnish

**PLANS, SPECIFICATIONS and ESTIMATES**

AND TO

SUPERINTEND THE CONSTRUCTION OF ROLLING MILLS AND MACHINERY, REGENERATIVE GAS FURNACES, TUBE AND PIPE MILLS, ETC., ETC.

I represent the latest improvements in all the above branches.

**M. V. SMITH, Metallurgical Engineer,**  
Rooms 16, 17, and 18 Bissell Block, Pittsburgh, Pa.

**Steam Pumps.**

Special sale of second-hand, in perfect order, viz: No. 5 Knowles, 7 in. steam, 4 in. water, 10 in. stroke, 3 in. suction; price \$125. No. 1 Knowles, 8½ in. x 2 in. 5 in. ditto, 1½ in. suction; \$60. No. 5 Cudmore, 7 in. x 3½ in. x 10 in. ditto, 2½ in. suction; \$100.

Worthington Duplex, 4½ in. x 2½ in. x 4 in.; \$50. Columbus, 7 in. x 2½ in. x 8 in., 2½ in. suction; \$75.

And many others. New Pumps, best in use without exception. All sizes on hand made to order. We buy, sell, exchange and rebuild all kinds of Pumps, or put our new Valve, gear on old pumps and warrant satisfaction. Write to

AMERICAN TOOL CO.,

Cleveland, O.

**Wanted.**

Practical Tap and Die Maker, soon as possible, for bolt shop. To No. 1 Mechanic permanence and good pay assured. Must be temperate, State experience and where. Reference wanted.

P. O. Box 257, Pittsburgh, Pa.

**Skates! Skates!**

950 pair new Rink Skates; Best on the market; retailed for \$3; will be sold in 100 pair lots, assorted sizes, to cents a pair; close to 42 cents a pair; assortment of sizes, 300 pair new, full nickled, half nail; sizes, 9½, 10, 10½, 11; to close price \$1; were retailed for \$5 per pair. Address P. O. BOX 160.

Boston, Mass.

**HARDWARE and STOVE BUSINESS**

located near New York; established 1848; always profitable. \$5,000 to \$10,000 cash required. Owner must retire.

Address FREDERICK FOSTER,  
P. O. Box 2401,  
New York City.

**FOR SALE, OR PARTNER WANTED**

to manufacture, a patented Bung-Porer, a new invention; the best thing out for the purpose; correspondence solicited.

Address GUSTAV A. STRANGER,

Chester, Conn.

**PROPOSALS WILL BE RECEIVED UNTIL**

July 6th for 200 to 300 tanks Mixed Acid, 4 to 7; 50 to 75 tanks Light Distilled Glycerine; 300 to 400 bags of Nitrate of Soda; 100 to 150 bags of Wood Pulp. All goods guaranteed pure in every respect, and subject to rigid inspection, by a practical chemist. Purchaser will pay cash.

Address "DYNAMITE,"

Office of The Iron Age, 66 and 68 Duane St., N. Y.

**WANTED**—A Superintendent for a Wire Mill making Fine Wire and Cloth; one who thoroughly understands his business may address "G. B."

Office of The Iron Age, 66 and 68 Duane St., N. Y.

**THE** advertiser, who has had a long experience as Bookkeeper, Traveling Salesman and Agent for manufacturer, and with an extensive acquaintance with the Hardware and Iron trade West and South, desires a position in the city preferred, though he would take part of the time. References first-class.

Address "J. H. H."

Office of The Iron Age, 66 and 68 Duane St., N. Y.

**WANTED**—A thorough and practical man of 15 years' experience in Hardware and wholesale and retail, is open for an engagement from July 1st as Buyer, Salesman or Traveler; has had five years' experience as traveler with manufacturers; best of N. Y. references. Address "SHERIDAN,"

Office of The Iron Age, 66 and 68 Duane St., N. Y.

**WANTED.**

A young, active man, experienced in Builders' Hardware, was formerly an old-established house in Chicago. Capital required for a one-third interest, \$10,000. Address with full information as to present and former engagements, in strict confidence.

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In buildings and plants, - 4,100,000.00

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**MANUFACTURERS, or shippers of COAL,****PIG IRON, IRON ORE LUMBER, ETC.**

etc. parties who wish to build **BRIDGE** **ELEVATORS** etc. please correspond with us.

Contractors for River and Harbor Improvements, Dredging Dock and Pier Construction, Pipe Foundations, etc. Estimates on application.

Office

## Special Notices.

## Second-hand Machinery for Sale.

Two Engine Lathes, 87 in. swing, 20 ft. 6 in. bed, Geared in Face Plate, Screw Feed, Compound Rest, One Engine Lathe, 15 in. x 6 ft. One Cylinder Boring Lathe, 33 in. x 10 ft. bed. One Planing Machine, 32 x 10 ft. Lathe & Morse make. Good order. One Iron Planer, planes 24 ft. long, 62 in. x 62 in. Excellent condition. One Iron Planer, planes 8 ft. long, 30 in. x 30 in. Two Iron Planers, plane 6 ft. long, 24 in. wide. Three Iron Planers, plane 4 ft. long, 24 in. x 24 in. Three Iron Planers, plane 5 ft. long, 18 in. x 20 in. One Oliver Bros. & Phillips' Bolt Header. One Four-Spindle Nut Tapper. One 1750-lb. Bement Steam Hammer. Excellent. One Small Steam Hammer. One Dead Stroke Hammer. Good order. One Hydraulic Wheel Press. One 25-inch stroke Shaping Machine. One No. 3 Portable Drill. One Steam Riveting Machine. One 20-inch B. G. S. F. Upright Drill. One Slitting Machine, 6-in. stroke. Bement's make. One Profiling Machine. One Axle Lathe, for car axles. One Durrell 7 Spindle Nut Tapper. Send for lists New and Second-hand Tools, too long for publication.

Soil Agents EDISON SHAFTING MFG. CO., THE GEO. PLACE MACHINERY CO., 121 Chambers and 103 Beale Streets, NEW YORK.

## BARGAINS.

One 26 x 42 in. Hor. Engine, Goodwin Cut-off. One 20 x 48 in. Corliss Engine. One 14 x 45 Vertical New York Safety Engine. One 8 H.-P. Sharpe Engine and Boiler, One 6 H.-P. Baxier Engine. One 10 H.-P. Liger Holting Engine. One 28-in. swing, 16 ft. bed, Engine Lathe. One 22-in. " 16 ft. " " One 15-in. " 10 ft. " " One 10-in. " 6 ft. " " One 15-in. " 5 ft. " " One 7-Spindle Pratt & Whitney Drill. One 50-in. Boring and Turning Mill. One 20-in. Coleman Drill, New Haven. One 12-in. N. Y. Steam Engine Co. Comp'd Planer. One 10 H.-P. Marine Boiler. One 60 H.-P. Vertical Boiler. One 60 H.-P. Hor. Tubular Boiler. One 20 H.-P. " " " One 30 H.-P. Portable Engine, Erie City. One 5 H.-P. " Taher & Morse, on wheels. One 5 H.-P. " Payne Vertical. One 14-in. Steam Cylinder Worthington Duplex Pump. Write and say what you want I have a large stock, constantly changing.

HENRY I. SNELL  
135 North 3d Street, Philadelphia

## E's and B's.

The largest and most reliable stock of Engines and Boilers in America. All sizes and styles, and all made of the very best material at lower prices than common, cheap country-made work can be sold. These Engines are all made interchangeable by special machinery. Agents wanted, and orders from the Trade solicited.

Write for Illustrated Catalogue and particulars.

H. M. SCIPLE,  
107 and 109 N. Third St., Philadelphia, Pa.

## FOR SALE.

Large lot second-hand Iron Tanks, from 5000 gals. down; all sizes and shapes.

About 625 ft. 4-in. Wrought-Iron Tubes with threads cut in them; good as new.

Lot new 10 gal. Oil Tanks with pumps; all complete.

Lot second-hand Engines and Boilers.

Lot new Mule and Horse Shoes, Wrought and Cast Scrap, Red and Yellow Brass.

BUSSENIUS, CUNLIFFE & CO., Dealers in Scrap Iron and Old Metals.

12th and Washington ave., Philadelphia.

## FOR SALE.

A nearly new four-ton Steam Hammer, in first-class condition. Made by the Morgan & Williams Engineering Co., of Alliance, Ohio. Very best manufacture. Address WORCESTER STEEL WORKS, Worcester, Mass.

## SHEAR FOR SALE.

A fine Power Shear, "Alligator" style, geared; will cut flat bar from 6 x 1/2, 2 x 3/4 and 1 1/4 round. Weight 3000 lbs. Will cut only a few sheets of iron. Ranted good as new in every respect. Cost now in April, \$200. Price \$200. Peacock Punch and Shear Co., 32 Liberty St., New York.

## Specialties in Cutlery.

Having unexcelled facilities for manufacturing novelties in Cutlery, Shears, Edge Tools, &c., we solicit correspondence with inventors or any who desire to have these articles manufactured and pushed. EMPIRE KNIFE CO., West Winsted, Conn.

## Wanted.

Useful Hardware Specialties to manufacture on good terms, by a well-established factory and good trade.

Address HARDWARE FACTORY,

Office of The Iron Age, 4th and Main Sts., Cincinnati, O.

## Wanted,

a good, sober business man for Partner, with four or five thousand dollars, to take an interest in a good manufacturing business. For further particulars, address

"BUSINESS INDUSTRY,"

Office of The Iron Age, 4th and Main Sts., Cincinnati, O.

## WANTED,

A Chemist. One experienced in Blast-Furnace and Open-Hearth Steel Works preferred. To conduct laboratory work, &c.

Apply CHESTER ROLLING MILLS,

Thurlow, Pa.

## NOTICE.

Large Buyers of Shafting are requested to send specification for special prices.

MERWIN McKAIG,  
Cumberland, Md.

## Trade Report.

## British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, July 7, 1886.

**Scotch Pig.**—The market is dull and featureless. We continue quotations as follows, the only change from last week being in Coltness, which is 1/6 lower:

Coltness, alongside, Glasgow.	45/6
Langloan.	43/
Gartsherrie, "	43/
Summerlee, "	46/
Carnbroe,	42/
Glengormock, " Ardrossan.	42/6
Eglinton,	39/
Dalmellington, " at Leith.	40/6
Shotts.	44/
Carriage from Ardrossan to Glasgow is 1/ Ton.	

**Cleveland Pig.**—The market remains in the same condition as reported last week; no change in prices, which we quote as follows: f.o.b. shipping ports:

Middleboro', No. 1 Foundry.	32/6
No. 2	31/9
No. 3	30 @ 30/6
No. 4 Forge.	29/6

**Bessemer Pig.**—The market is a little steadier, but nothing has developed to justify a change in quotations, which are as follows: W. C. Hematites, 42/ for mixed lots, Nos. 1, 2 and 3, equal portions, f.o.b. shipping ports.

**Manufactured Iron.**—The market is irregular, with quotations same as last week, viz.:

	£ s. d.	£ s. d.
Staff, Ord. Marked Bars.	7 0 0	7 10 0
" Medium "	5 10 0	6 0 0
" Common "	4 17 6	5 5 0
Hoops, 20 W. G. and over.		
" Common Best "	6 15 0	6 0 0
" Medium "	6 0 0	6 10 0
" Common "	5 5 0	5 15 0
Sheets, 20 W. G. and under.		
" Ordinary Best "	7 5 0	8 0 0
" Common "	6 5 0	7 0 0

**Steel Rails.**—The market maintains a steady tone, with prices same as last week, viz.: £3. 7/6 @ £3. 10/ f.o.b. shipping ports.

**Old Rails.**—The market is unchanged; quotations remain the same, viz.: Old D. H.'s, c.i.f. New York, 55.

**Scrap.**—This market is very dull. No change in quotations, which we continue as follows: Heavy Wrought, 50/; Bessemer Crop Ends, run of mill, 54/ @ 56/, c.i.f. New York.

**Copper.**—For the first time in many weeks we have no change to report in this market. We continue last week's quotations as follows: Chili Bars quoted £39. 10/ @ £40, and Best Selected £43. 10/ @ £44.

**Tin.**—The market is a little steadier, and futures may be quoted 10/ higher. Straits Tin, spot, £10. 10/ @ £102, and futures £102. 10/ @ £103.

**Tin Plates.**—The market remains steady, without quotable change.

Tin Plates, 10x14, 1st qual. Charcoal, 18/ @ 12/

" 2d " 16/ @ 17/6

" 1st " Coke, 15/ @ 15/6

" 2d " 18/6 @ 14/

**Spelter.**—The Spelter market is unchanged at last week's quotations, viz.: Ordinary at shipping ports, £13. 15/ @ £14.

**Lead.**—The market is without change, and quotations remain the same as last week, viz.: Common English Pig, £3. 15/ @ £14.

**Freights.**—Steam from Glasgow to New York, 5/.

## Financial.

Office of The Iron Age, WEDNESDAY EVENING, July 7, 1886.

Inquiries directed to the discovery of "a boom" in the business horizon lead to the conclusion that there is nowhere in the channels of trade a glut of manufactured goods, and that a fair demand may therefore be expected for tools, implements and all reasonable merchandise; but beyond a regular legitimate traffic, free from speculative excitement, there is no "boom" either to be expected or desired. Anything beyond this could have no substantial basis.

The Stock Exchange markets have been quiet, but generally strong. Sales were comparatively limited. There was a gradual recovery from the Lake Shore strike, and on Thursday there was an advance in nearly all the leading shares. The Vanderbilts and Eries were favorably influenced by the traffic returns, and on Friday a like influence was exerted by higher prices in London. Indians, Bloomington and Wisconsin drooped in consequence of the appointment of a receiver. Saturday there was a decidedly upward tendency, Western Union taking the lead upon rumors of a settlement of the cable war. On Tuesday there was a decline under a bear attack, and to-day there was no special feature.

Quotations for leading stocks were as follows: Consolidated Gas advanced from 80 to 82 1/2 @ 82 1/2. The general market was firmer. Lackawanna sold at 129 1/2; Delaware and Hudson, 99 1/2; Erie, 30; Jersey Central, 56 1/2; Reading, 25 1/2; St. Paul, 32 1/2; Lake Shore, 84 1/2; Canada Southern, 44 1/2; Northwestern, 113 1/2; Omaha, 47; preferred, 110; Union Pacific, 56 1/2; Western Union, 67; Tennessee Coal and Iron, 45.

United States bonds sold as follows:

	Bid.	Asked.
U. S. 3 per cent.	100 1/2	
U. S. 4 1/2, 1881, coupon.	111 1/2	111 1/2
U. S. 4, 1887, coupon.	125 1/2	126
U. S. Currency 6s, 1885.	126	—
U. S. Currency 6s, 1886.	129 1/2	—
U. S. Currency 6s, 1887.	131 1/2	—
U. S. Currency 6s, 1888.	132 1/2	—
U. S. Currency 6s, 1889.	136 1/2	—

The aggregate of Clearing-House exchanges in 30 cities last week show an increase of 36% compared with the corresponding week last year; outside of New York, an increase of 27 1/2%. The total exchanges for the month of June was \$3,

085,021,001; increase, 33%; first six months' increase, 29%.

The Sundry Civil bill as passed contains both the provision for a reissue of the \$1 and \$2 greenbacks and the clause authorizing the issue of \$1, \$2 and \$5 silver certificates. The vote upon Mr. Bland's silver certificate amendment was almost unanimous.

**Metal Market.**—Copper.—Since our last report the market here has been very flat, the best bids obtainable for Lake Superior spot and futures being 9 1/4 @ 9 1/2. Sellers are reluctant

with the Metal at these low quotations; still it works as though ultimately the price of 10/ could not be maintained. Best Selected meanwhile gave way in London to £43. 10, and from being worth £39. 12/6 in London the first two days of the month Chili Bars since declined to £39. 10.

**Tin.**—Since our last report another attempt has been made in London to break down the price of Tin, but it only proved a partial success, the lowest price for spot and futures touched being £99. 15/ last Friday. From this it rapidly advanced to £101. 10/ spot, and £102. 10/ futures, the quotations this morning, the tendency at the same time remaining upward. Here we gradually, but unwillingly, followed in the wake of the London market, our lowest quotation last week having been 22 1/4, spot and July and August delivery; from this we advanced

swiftly since the holiday to 22 3/4, which has been paid for July and August delivery, the spot price in 5-ton lots being 22.60@ at the close.

The quantities offering in this market from London, fresh shipments, have fallen off considerably. It looks as though London could not spare us any large quantities, at least at present prices. It remains to be seen whether we shall be forced to go to London for our necessities,

and whether London will feel disposed to part with more at our prices. We are inclined to believe that in the end it will become a necessity on the part of our dealers to submit to the dictation of London, whatever the price there may happen to be.

**Tin Plates.**—There has been but a moderate demand, with no change in prices except in Cokes, which are 5@ box higher, and the stock of which is very light, caused by California drawing upon us heavily for a further supply.

We quote at the close, large lines,

ordinary brands, 3@ box: Charcoal

# Trade Report.

## New York.

**American Pig.**—The principal sellers of Southern Irons report their furnaces well sold up for the next few months, and little or no business has been done by them during the past week. The reports of concessions on standard brands, given currency by some of our contemporaries, rest on a flimsy foundation. We have not been able to trace them to any reliable source. The market remains quiet and steady. We quote for standard brands, tidewater delivery, \$18 @ \$18.50 for No. 1 X Foundry, \$17 @ \$17.50 for No. 2 X Foundry, and \$16 @ \$16.50 for Gray Forge, with the market in buyers' favor. Outside brands are 50¢ below these quotations. We print our usual monthly statistical report elsewhere.

**Scotch Pig.**—The arrivals are light, and, with the exception of insignificant quantities, are sold previous to arrival. Firmers make importers indifferent sellers at present prices. We quote nominally as follows for small lots: Coltness, \$19.75 @ \$20 to arrive; Gartsherrie, \$19 @ \$19.25 to arrive; Shotts and Langloan, \$19.50 @ \$20 to arrive; Carnbroe and Glenarnock, \$18.50 @ \$19 to arrive; Summerlee, \$19.50 @ \$19.75 to arrive; Dalmellington, \$18.50 @ \$18.75 to arrive; Eglington, \$17.50 @ \$18 to arrive, and Clyde, \$18 @ \$18.50 to arrive.

**Bessemer Pig.**—The market has been very quiet, no sales of Foreign or Domestic being reported. We quote Foreign nominally \$18.75 @ \$19, and Domestic \$18 @ \$18.50 at furnace.

**Spleigleisen.**—Aside from the sale of a small lot at a higher figure than our quotations, we hear of no business. We quote English, large lines, \$25 @ \$25.25, and German nominally \$25.

**Bar Iron.**—The market remains fairly steady. It is little influenced by the strike at the Philadelphia mills. We continue to quote for delivery here in round lots: Common Iron, 1.65¢ @ 1.70¢; Medium, 1.70¢ @ 1.75¢, and Refined Iron, 1.75¢ @ 1.9¢. Store prices are 1.75¢ @ 1.80¢ for Common, 1.85¢ @ 1.90¢ for Medium, and 1.9¢ @ 2.0¢ for Refined.

**Structural Iron and Steel.**—One or two considerable contracts have been awarded during the week. The market is quiet and steady. We quote for Angles 2¢ @ 2.10¢, delivered, and Tees at 2.40¢ @ 2.45¢, for round lots. Steel Angles are quoted 2.35¢ @ 2.45¢, according to quality. Store quotations remain 2.25¢ @ 2.4¢ for Angles, and 2.6¢ @ 2.7¢ for Tees. American Beams and Channels are nominally 3¢ base from dock for all orders.

**Plates.**—Some of the Plate mills are running short of orders, and are displaying some anxiety for business. We quote for round lots: Common or Tank, 2.10¢ @ 2.20¢; Refined, 2.4¢ @ 2.5¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.4¢ @ 3.5¢; Extra Flange, 4¢ @ 4.5¢. For small lots of Steel Plates the quotations are as follows: Tank, 2.70¢ @ 2.75¢; Ship, 3¢; Shell, 3.4¢; Flange, 3.5¢, and Fire-Box, 4¢ @ 4.5¢, on dock.

**Merchant Steel.**—We quote nominally for the range from ordinary to good grades as follows: American Tool Steels, 7.5¢ @ 9¢; Tool Steel of special grades and finer qualities, 12¢ @ 20¢; English Tool, 13¢ @ 15.5¢; common grades, 7¢ @ 9¢; Crucible Machinery, 4.5¢ @ 6¢; Round and Flat Spring, 2.3¢ @ 2.5¢; Round-Edge Tire, 2.5¢ @ 2.5¢; Square-Edge Tire, 2.6¢ @ 2.7¢; Toe Calk, 2.6¢; Sleigh Shoe, 2.5¢ @ 3.0¢; Open-Hearth Machinery, 2.4¢ @ 2.6¢, and Bessemer Machinery, 2.15¢ @ 2.25¢, with freight allowance.

**Wire Rods.**—We continue to quote nominally, on a light business, \$38 @ \$39 for Ordinary Steel Wire Rods.

**Steel Rails.**—We bear of a sale to an Eastern road at \$34 of about 3000 tons, light section, to Florida, and of about 3000 tons of English Rails to the Michigan Central. We quote \$34 @ \$35, according to size of order, time of delivery, &c.

**Old Rails.**—No business whatever is reported either in Foreign Rails, which have declined to 53¢, c.i.f., or in American Old Rails. There are negotiations pending, however. A lot of 500 tons of Foreign Double Heads, at Baltimore, has gone into store, having been offered in vain at \$20. We quote this market \$18.50 @ \$19, and note that some in the trade report a hardening tendency.

**Scrap.**—The feeling is slightly better, after forced sales of lots held by weak parties. We quote \$18.25 @ \$18.50 from yard.

**Rail Fastenings.**—We quote nominally 2.40¢, delivered, for Spikes, and 1.80¢ @ 2¢ for Angle Fish Bars.

## Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,  
PHILADELPHIA. July 6, 1886.

Business has been virtually suspended since date of our last report, so that there is nothing to be said as regards actual transactions. The outlook is considered to be somewhat promising, as there are a great many inquiries, some of which will doubtless result in business at an early date. The position is very sensitive, nevertheless, and every one appears to be watching sharply to see

what turn things will take. There is quite a possibility of a sharp upward turn in prices, but it requires a start, and how that will come or whether it will come at all remains to be seen. The indications are not all favorable, and the course of the market will depend a good deal upon the character of the developments within the next 30 days. Reports of the grain crops are not by any means promising, and there is still considerable uneasiness among labor, and until the position is more fully understood a degree of hesitancy is not to be wondered at.

**Pig Iron.**—There is very little demand at present, but of good brands there is no surplus worth mentioning. Low grades are still plenty, however, and the market has an irregular appearance, owing to the anxiety to secure offers. Consumption is likely to be very light during the next two or three weeks, so that early improvement in the demand can hardly be expected. Prices about as follows: No. 1 Foundry, tidewater delivery, \$18.25 @ \$19 for standard, and \$19.50 @ \$20 for choice. Southern No. 1, ex-ship, \$17 @ \$18.50, according to brand. Gray Forge at tide, \$16 @ \$16.50 for standard Pennsylvania and Virginia Irons, and \$17.75 @ \$18 for choice brands. Southern, ex-ship, \$15 @ \$15.50, according to brand. No. 2 Foundry is dull and in large supply at \$17 @ \$17.50 at tide.

**Foreign Iron.**—There is nothing doing in Bessemer, and prices are nominal at \$19 @ \$19.50, c.i.f., according to brand. Spiegel-eisen is about \$21 for 10 @ 12%, with \$25 asked for 20%.

**Blooms.**—Steel Blooms are active within the range of our quotations, say: Slabs for Nail Plate, \$29 @ \$30 at tide for Foreign and \$30 at mill for Domestic, and from that to \$35 for higher qualities; special grades for Boiler Plates and other uses requiring high tensile strength, \$34 @ \$36. Other Blooms as follows: Charcoal, \$52 @ \$54; Run-out Anthracite, \$43 @ \$44; Scrap Blooms, \$33 @ \$34, and Ore Blooms, \$34 @ \$35.

**Muck Bars.**—Holders are firm at \$28 @ \$28.50 at mill, with a fair amount of business doing.

**Manufactured Iron.**—The mills in this vicinity closed on Wednesday last, and, it is said, will not start up again for some time to come. The men insist on a new schedule, which the employers just as firmly refuse, so that there is no alternative but a lockout.

There is certainly nothing in the position to warrant an increase in cost of production, so that from present appearances the strike will be a long one.

There has been a good deal of inquiry for Finished Iron within the past couple of weeks, and it looks as though the mills might be kept busily employed, although at low prices. The tendency is to stiffen up a little, however, and, if the strike continues any length of time, slightly higher prices are not improbable. To day's quotations are 1.8¢ @ 1.85¢ for Best Refined Bars, 1.7¢ @ 1.75¢ for Medium, 2¢ @ 2.1¢ for Plates and Angles, and 3¢ for Beams and Channels.

**Steel Rails.**—There is no change to report in this department; there is plenty of demand at steady prices, say \$34.50 @ \$35, at mill; perhaps \$34 for large lots, winter delivery.

There are a good many inquiries on the market—some for deliveries a year ahead—the mills being almost filled up for the next four months.

**Old Rails.**—There is more inquiry, but sellers are so anxious for business that prices have not improved. There are free sellers at \$19.50, afloat for Philadelphia, but bids of \$19 are not easily obtained, except for small lots. A sale of 500 tons Bull Heads was made at \$19.50, afloat, and a choice lot of T's in the interior at \$21.50. Lots in store held at \$21 @ \$21.50.

**Scrap Iron.**—The market is firm, and holders ask outside figures, as follows: No. 1 Wrought Scrap, \$18.50 @ \$20; No. 2 do., \$13 @ \$14; Turnings, \$14 @ \$14.50; Old Car Wheels, \$15 @ \$16; Old Steel Rails, \$18.50 @ \$20; Fish Plates, \$23 @ \$24—sales 150 tons at \$23.25; Cast Scrap, \$14 @ \$15; do. Turnings, \$10 @ \$10.50.

**Nails.**—The market is very quiet, but prices are firmly maintained at \$2.10 @ \$2.15 from store.

## Pittsburgh.

Office of *The Iron Age*, 77 Fourth Avenue,  
PITTSBURGH, PA. July 6, 1886.

While there has been no perceptible improvement in general business the past week, a more hopeful feeling is being developed, and this has a good deal to do with bringing about an improvement. The outlook for a good fall trade is generally considered encouraging, and there is no good reason at present why these expectations should not be realized. The reports from the West and South are generally favorable. Mr. R. J. Anderson, the Steel manufacturer, is just back from a Western trip, and he reports that there has been a decided change for the better westward within the past few weeks. In the winter wheat growing States of Ohio, Indiana, Kentucky and Southern Illinois the wheat harvesting is almost finished. Mr. Anderson reports that it was commenced several weeks sooner this year than usual, so that farmers will have more time between harvesting and seeding to give to making improvements. Our manufacturers, in view of the favorable reports in regard to the crops, and the fact that the labor troubles are much less frequent, are in a more hopeful spirit, looking for a good fall trade, and as stocks both in

the hands of jobbers and consumers are light, it is probable that orders for nearly all kinds of manufactured goods will begin to come forward earlier than usual. The river Coal operators are in good condition for the summer, having got out about all the Coal they had loaded on the last two freshets, and nearly all the fleet of towboats succeeded in getting back with their tugs to the iron craft.

**Ores.**—As nearly all the furnaces hereabouts are in blast, the consumption of Ore is large and likely to continue so during the remainder of the year. The project of building a railroad to connect Pittsburgh with the Ore fields of Eastern Virginia has again been revived, and sooner or later it will no doubt be accomplished. It is said that it will only require 150 miles of road to be built, and the scheme is most important to the iron trade of Pittsburgh.

**Pig Iron.**—There has been no important change in the situation during the past week; trade continues very slow, but it is confidently expected that there will be an improved demand before the close of the month. The indications are favorable for an improved Finished trade, and this is all that is required to bring about an increased demand for the raw article. Stocks in hands of consumers generally are very much reduced, as they make it a point to close the month of June with just as little as possible, in order to take stock. Prices remain unchanged, as compared with those of a week ago, but have declined fully 50¢ per ton within a month or six weeks. We report former quotations:

No. 1 Neutral Mill.....	\$16.00	@ \$16.25.	4
No. 2 Neutral Mill.....	15.50	@ \$15.75.	4
All-Ore Mill.....	17.00	@ \$17.50.	4
Crucible and Bottled.....	15.00	@ \$15.50.	4
No. 1 Foundry.....	18.00	@ \$18.50.	4
No. 2 Foundry.....	17.50	@ \$18.00.	4
All-Ore Foundry.....	18.50	@ \$19.00.	4
Foundry Charcoal.....	20.00	@ \$20.00.	4
Cold Blast Charcoal.....	24.00	@ \$27.00.	4
Bessemer Iron.....	18.50	@ \$19.00.	4

There have been sales of Bessemer Iron reported for some days; it is weak and has been offered in large blocks as low as \$17.75, cash. Considerable effort has been made here of late to push Southern Iron in this market, but not with much success. It is said that the "trial lots" of this Southern Iron have not proved very satisfactory, as it has been found to be too much inclined to cold short.

**Muck Bar.**—There have been no sales reported, in the absence of which we repeat former quotations, \$27 @ \$27.50, cash, as to delivery, quality, &c.

**Manufactured Iron.**—The mills have all had a very fair trade of late, which for a time was stimulated by the possibility of a strike, and the outlook at present is favorable for a good fall trade. Some of the mills are now stopped for stock-taking and repairs, but it is expected that they will all be running within a few weeks. Prices are still quoted on a basis of 1.65¢ @ 1.70¢ for Bars for first-quality Iron, and 1.75¢ @ 1.80¢ for Old-Rail Iron. A number of mills are working almost exclusively on Skelp Iron, for which the demand is likely to keep up until the close of the year.

**Nails.**—There is not much inquiry at present, but it is expected that there will be within a few weeks, and some of our manufacturers are anxious to get started up as soon as possible, in order to work an as-sorted stock, so that they will be prepared for business as soon as it opens up. Jones & Laughlin have already started up, and Zug & Co., Chess, Cook & Co., and Moorehead & Co. will do likewise as soon as their factories have been placed in condition.

Our Pittsburgh manufacturers have no non-union nailers, so that there will be no trouble on that score. Prices may be quoted in carlots at \$1.90 for Iron and \$2 for Steel Nails, 60 days, 2% off for cash. The regular meeting of the Western Nail Association takes place in this city on Wednesday of next week.

**Wrought-Iron Pipe.**—The Pipe mills are all busy, and are likely to be so until the advent of cold weather, possibly the close of the year. Prices remain unchanged. Discount on Black Butt-Welded Pipe, in carlots, 45%; Butt-Welded Galvanized, 35%; Black Lap-Welded 60%; Galvanized, 42.5%. For less than a carload, discount, 2.5% less than rates above quoted. Boiler Tubes, 52.5% discount; Oil Well Casing, 34-inch, 45% off; Oil Well Tubing, 34-inch, 45% off; 34-inch, 45% off; 2-inch Oil Well Tubing, 14¢; 8-inch Drive-Pipe, \$1.30.

**Steel.**—There is a lull in the Merchant Steel trade, but an improved demand is looked for within a few weeks; manufacturers generally expect a good fall trade. Bear brands refined Cast Tool Steel, 8¢ @ 9¢; Crucible Machinery, 3.5¢ @ 4¢; Open-Hearth do., 2.5¢ @ 2.7¢; Steel Boiler Plate, 4¢ @ 4.5¢; no recent sales of Bessemer Blooms or Billets or Rail or Bloom Ends reported, in the absence of which it is difficult to give reliable quotations.

**Steel Rails.**—Heavy sections are still quoted at \$36, cash, at mill for fall delivery; Mills here are not in condition to take any new business for delivery this side of October or November.

**Old Rails.**—The demand here continues light, as the large consumers are pretty well stocked and are refusing to make additional purchases unless they can do so at a bargain. We hear of some small sales of Old Iron Rails at \$21 here, and the same is noted regarding some grades of Coke Irons, which are quoted at \$19 @ \$19.50 in carload lots. Ohio Standard Black-bands are held very steadily at \$20 @ \$20.50 for the three leading brands, with some

**Railway Track Supplies.**—Prices remain unchanged at 2.40¢, 30 days, for Spikes, delivered; 1.65¢ @ 1.75¢ for Splice Bars, and 2.75¢ for Track Bolts with Square and 2.85¢ @ 3¢ with Hexagon Nuts.

**Old Material.**—There has been an improved business of late, and it is expected that all kinds of Old Material, Old Rails in particular, will rule much higher before the close of the present year. No. 1 Wrought Scrap, \$18 per ton; Axle Turnings, \$1.4 @ \$1.5; Old Axles, \$23 @ \$24; Cast Bearings, \$11 @ \$12, gross ton; Old Wheels, \$16; Cast Scrap, \$14 @ \$15, gross.

## Chicago.

Office of *The Iron Age*, 36 and 38 Clark St.,  
Cor. Lake St., Chicago, July 5, 1886.

The existing strike of the Lake Shore switchmen caused more or less uneasiness among business men during the week. The fear of its extending to other lines was greatly allayed by the refusal of the switchmen's union to involve other roads in the fracas. The company have been successful in moving freight guarded by armed forces, though business men have avoided shipping goods by that line as much as possible. At the Calumet Mill, in Cummings, Ill., matters at last have been settled and their entire works are about being placed in operation. In the Nail department they are running 80 machines non-union, and the Bar mill started up on the 29th ult., but was stopped two days later on account of necessary repairs to one of the furnaces. The Bar mill, guide mill and Steel department will be again put into operation during this week, with every prospect of permanent employment. The fruitless results to strikers in the West has made it a discouraging and odious undertaking. The public have been so surfeited with the riotous conduct and detrimental effects of strikes on business that the laboring men who undertake to force their claims upon employers through this medium no longer enlist the sympathy of even those who feel that their grievances are just. In this city and in the West popular opinion says that the day of successful strikes is past, and the boycott has lost its terror in every branch of business.

**Muck Bar.**—There have been no sales reported, in the absence of which we repeat former quotations, \$27 @ \$27.50, cash, as to delivery, quality, &c.

**Manufactured Iron.**—The mills have all had a very fair trade of late, which for a time was stimulated by the possibility of a strike, and the outlook at present is favorable for a good fall trade. Some of the mills are now stopped for stock-taking and repairs, but it is expected that they will all be running within a few weeks. Prices are still quoted on a basis of 1.65¢ @ 1.70¢ for Bars for first-quality Iron, and 1.75¢ @ 1.80¢ for Old-Rail Iron. A number of mills are working almost exclusively on Skelp Iron, for which the demand is likely to keep up until the close of the year.

**Hardware.**—The closing days of June and the opening ones of this month witnessed a still further decline in the demand for Hardware. The majority of the houses close at 1 o'clock on Saturday, and this week will not open until Tuesday morning, which lessens the business days of both weeks, and possibly destroys the ambition of buyers for several days to come. The jobber is now turning his attention more toward the purchase of fall goods. Jobbers claim that an average advance of 10% has been made on the whole line of Shelf Hardware. Changes have been made

**Birmingham.**

BIRMINGHAM, ALA., July 5, 1886.

In the agricultural portions of this State the tendency of business is still downward. Rain continues to fall about every other day. In the greater part of the cotton belt the staple has certainly been damaged beyond the possibility of entire recovery, and the outlook is that the crop will be one of the poorest that has been gathered since the war. Corn suffers severely, too. In some sections, according to the newspaper accounts, the farmers are almost forced to a choice between the two crops, one being as much as they can get out of the grass to an extent that will pay for the necessary work. As farmers' lamentations have traditionally been taken *cum grano*, however, it is not unreasonable to hope that things are not so bad as they seem. Matters are not so blue in the mining and manufacturing district, though there's nothing conspicuously rose-colored in the little news of the last week. Active railroad building continues to make business good in heavy goods, some of the largest contractors on the Kansas City Railroad (as the Birmingham and Memphis is popularly called) having broken ground in the last few days. The Sloss Furnace Co., too, have commenced grading for several miles of track, to connect an iron-ore property with the Alabama Great Southern road, near Irondale, 5 miles out of the city. Labor is in demand at \$1.25 per day, the Kansas City men having raised the price 25¢. Ore lands are eagerly sought after. The trade spoken of in this correspondence last week, by which a New York syndicate was to get 800 acres of Red Mountain lands, has been consummated. Preparations continue for increased operations among the ore contractors already in business.

**Pig Iron**—Is feeling to a slight degree the effect of the labor troubles in the East, which naturally blunt the edge of competition for Western trade. Some cessation of cutting among Southern producers is to be noted, and an advance of some 25¢ over the prices of a week ago, which, however, just about offsets the effects of the depressing agencies that have been at work for the last month or so. Shipment is notably easier, except eastward, cars being still scarce on the lines running that way.

**Finished Iron**—In this line the most troublesome cuts seem now to come from Southern manufacturers. But for these it seems prices would probably be just about what they were all spring. The demand is not quite what it has been, though.

**Nails**—Are a little weak, with the nominal rate at Brierfield and Helena still \$2.25. There is a distinct downward tendency.

**Miscellaneous**—Outside of orders for portions of railroad contractors' outfit nothing worthy of note has been taken in by the shops this week. All are busy enough on business of creditable character. A flouring mill just starting is using a 125-horse-power Corliss engine made by the Birmingham Iron Works, and the first of the kind ever made in the South, it is said.

**Chattanooga.**Office of *The Iron Age*, Carter and Ninth Sts.,  
CHATTANOOGA, July 5, 1886.

There have been no changes of importance in general business since our last report. Towns located in the vicinity of the manufacturing districts are having a good run of business in all lines, while those so located as to be dependent upon the farming districts are complaining very much of dull trade and collections hard to make. Rains have not been so prevalent for the past week, enabling the farmer to pay more attention to his crops, which had begun to look almost past redemption.

**Pig Iron**—Sales of Pig Iron appear to be made about as fast as the furnaces are able to turn it out. While many sales are being made on private terms, yet, so far as we know, the price appears to keep up remarkably well. Interior parts in Pennsylvania are lately taking Iron in considerable quantities, and from the many inquiries that are being received from that section it would appear that consumers there are looking in this direction for their supplies. Eastern points are not behind in the demand for Southern Pig; within the last two weeks about 33,000 tons have been contracted for these markets to go forward during the balance of the year. The demand from Southern foundries has fallen off to some extent, their business at this season being usually dull, but contracts are being freely made by them for fall delivery.

**Lumber**—Business in this line has kept up remarkably well. The heavy rains have had a tendency to keep up the streams, and the millmen have taken advantage of it to keep their mills well supplied with logs. The consequence is that shipments have been as heavy as at any time during the spring.

**Miscellaneous**—The prospect of the construction of a Pipe mill at this place is now reduced to a positive certainty. Most of the machinery is contracted for and will be on the ground as soon as completed. They will run in connection with the Lookout Iron Co., who will make the Skelp Iron for them. At present it is their intention to make only Butt-Welded Pipe. The mill is expected to be in operation about the first of the coming year.

**Cincinnati.**

JULY 5, 1886.

**Pig Iron**—Dealers report that, while inquiries from consumers are abundant, but few orders have been placed, and most for present use, and at prices not fully sustaining former quotations. A sale to one of the rolling mills here of 3000 tons Southern Forge is reported for delivery through the year; prices not stated. It is the policy of producers to sell their product as fast as made, or to sell anticipating their makes. Consumers who know of their future wants are fully aware of the situation, and are dictating as to prices and times of delivery. Dealers here who are the agents of the large producers in the South, appreciating the situation, have already made prices to the largest consumers in the West and Northwest to secure the orders. An increased amount of trade throughout the West is expected, but it is thought that the trade must wait for more substantial development. Quotations for the past week:

*Charcoal Foundry.*

Hanging Rock, Best, No. 1, 4 mos. \$21.00 @  
Hanging Rock, Good, No. 1, 4 mos. 20.00 @ 20.50  
Hanging Rock, Good, No. 2, 4 mos. 18.50 @ 20.00  
Southern No. 1, 4 mos. 18.00 @ 19.00  
Southern No. 2, 4 mos. 17.00 @ 17.50

*Coke Foundry.*

Ohio and West Pennsylvania, No. 4 mos. 18.00 @ 20.00  
Ohio and West Pennsylvania, No. 2, 4 mos. 17.00 @ 18.00  
Southern—Virginia, Tennessee, Alabama and Georgia, No. 1, 4 mos. 16.50 @ 17.50  
Southern—Virginia, Tennessee, Alabama and Georgia, No. 2, 4 mos. 16.00 @ 17.00  
Close Foundry and Mill grades.... 14.50 @ 15.50

*Silver-Grey Softeners.*

Ohio Stonecoal, No. 1, 4 mos.... 17.50 @ 18.50  
Ohio Stonecoal, No. 2, 4 mos.... 16.50 @ 17.50  
Ohio Stonecoal, No. 3, 4 mos.... 15.00 @ 17.00

*Car-Wheel.*

Southern Warm-Blast Char'l, cash Standard Warm-Blast Charcoal 4 mos. 17.00 @ 18.00  
Hanging Rock, Warm-Blast Charcoal 4 mos. 23.00 @ 25.00  
Hanging Rock, Cold-Blast Charcoal, 4 mos. 24.50 @ 25.00  
Southern Cold-Blast Charcoal, 4 mos. 27.00 @ 29.00

*Forge.*

Southern Coke, Neutral, 4 mos.... 14.50 @ 15.00  
Southern Coke, Col'd Salt, 4 mos.... 13.50 @ 14.00  
Southern Coke, low grades.... 15.00 @ 17.00

*Scrap.*

Rails.... 20.00 @ 20.50  
Wheels.... 16.50 @ 17.00  
Wrought, for range of grades, \$100. 50 @ .85  
Cast, for range of grades, \$100. 30 @ .65

*Customary discount, 40¢ @ 50¢ per ton*

for cash from time prices.

**Louisville.**

GEORGE H. HULL & CO., of Louisville, report to us as follows, under date of July 6: There is a much better inquiry for Pig Iron and more sales have been made, but there is no improvement in price, and on inferior Irons slightly declining. The favorite brands as a general thing are held firmly, and when sales are made are usually sold at sellers' figures. On other brands sellers are making concessions to meet these views. A large difference is the consequence on sales booked between the different brands ordered—in some cases as much as \$2, but usually not more than \$1 @ \$1.50. We quote for cash as below:

*Pig Iron.*

Southern Coke, No. 1 Foundry.... \$16.00 @ \$17.00  
" " No. 2 " " 15.00 @ 16.00  
" " No. 3 " " 14.50 @ 15.50

*Hanging Rock Coke, No. 1 Foundry.*

16.00 @ 16.50  
Hanging Rock Charcoal, No. 1 Foundry.... 18.00 @ 19.00

*Southern Charcoal, No. 1 Foundry.*

18.00 @ 18.00  
Silver Gray, different grades.... 14.00 @ 15.50

*Southern Coke, No. 1 Mill, Neutral.*

14.00 @ 15.00  
" " No. 2 " " 13.50 @ 14.00

*" " No. 1 " Cold Short.*

13.50 @ 14.00  
" " Charcoal, No. 1 Mill.... 17.00 @ 17.50

*White and Mottled, different grades.*

Southern Car-Wheel, standard brands.... 25.00 @ 24.50

*Southern Car-Wheel, other brands.*

25.00 @ 24.50  
Hanging Rock, Cold-Blast.... 19.50 @ 20.50

*Warm-Blast.*

19.50 @ 20.50

*Old Material.*

The market for Old Material is quite, and on the whole dull. There has

been some demand for Old Rails and Wheels.

Old wheels are offered at \$15, and \$14.50 is

bids for them; there have been some sales

made at inside quotations. Small sales of

other descriptions of Scrap have been made,

which, according to the quality of the lots,

will bring from inside to outside quotations.

Rails, \$100. 200 @ \$200.50

Wheels, \$100. 14.50 @ 15.00

No. 1 Wrought, \$100. 85 @ .95

No. 1 Country Wrought, \$100. 70 @ .80

No. 1 County Wrought, \$100. 65 @ .60

Old rails, 100. 40 @ .45

Boilers, cut, \$100. 40 @ .45

Boilers, uncut, \$100. 35 @ .35

Fines, Tanks and Sheets, \$100. 35 @ .35

Axles, \$100. 90 @ 1.00

**St. Louis.**

ROGERS, BROWN & CO., St. Louis, W. H. SHIRES, manager, report, under date of July 5: There is considerably more inquiry, and buyers seem inclined to contract at present prices for their future wants, having evidently made up their minds that prices have at last touched bottom. We quote for cash, f.o.b. cars St. Louis:

*Charcoal Foundry.*

Missouri.... \$17.00 @ \$18.00

Southern.... 17.00 @ 18.00

*Coal and Coke Foundry.*

Southern, No. 1.... 17.00 @ 18.00

Southern, No. 2.... 16.50 @ 17.00

Ohio Softeners.... 17.00 @ 20.00

*Mill Iron.*

Missouri.... 16.00 @ 16.50

Southern.... 15.00 @ 15.50

*Car-Wheel and Malleable Irons.*

Southern.... 20.00 @ 25.00

Lake Superior.... \$1.00 @ 25.00

*Scrap, &c.*

Old Wheels.... 15.75 @ 16.25

Connellsville Coke (Frick's).... 5.50 @ 5.50

**Coal Market.**

So far from being advanced July 1, the prices of Anthracite are more affected by weakness than at the time of our last report—not to say that they are perceptibly lower, for if there is any reduction the commission man has the benefit of it rather than the consumer. As the story goes, a cut was initiated by the Delaware and Hudson Canal Co. on the representation by customers that other parties were underselling, whereupon the Delaware and Lackawanna determined to meet any cut which rivals might make. Including an allowance in the shape of commissions it is said that Broken and Egg were offered 50¢ off from the circular. Quotations therefore run about as follows: Broken and Egg, \$2.00; Stove, \$3.25; Nut, \$3, f.o.b. At some of the large Coal agencies in this city no special activity is looked for much before September. The Pottsville Miners' Journal of July 3 says: "There is little prospect of improvement for the month at least, as transactions are limited to actual needs, owing to the prevalent belief in a continued unsettled market. Stocks are again beginning to accumulate at tidewater points, and production is going on without much regard to the quota assigned." In some quarters the alleged failure of several companies in the so-called combination to restrict production to the prescribed limits constitutes a serious grievance, suggesting retaliatory "cuts." The total production for the first half of this year is about 2,000,000 tons in excess of the output for the corresponding period of 1885. On May 31 the stock of Coal on hand at tidewater shipping points was 614,451 tons, compared with 525,641 tons at the corresponding date last year. In the fall an increased production will be natural as a result of an extension of the Pennsylvania Railroad into the Schuylkill region, where, it is said, they are making overtures for new business. Bituminous Coal is very quiet, and can be bought at \$3.15, f.o.b. in New York, or even lower.

Vessels are plentiful, but the National Association claim that the minimum rates are fully maintained, despite the scarcity of freights. There are now over 1000 vessels in the association.

**Imports.**

The following were the Imports of Hardware, Iron, Steel and Metals into the Port of New York for the week ending July 7, 1886:

*Hardware.*

Boker Hermann & Co. Cutlery, cs. 8  
Brown Bros. & Co. Cases, 4

Dickerhoff, Rafters & Co. Cases, 2

Field Alfred & Co. Cases, 2

Foley H. & D. Gums, cs. 2

Gone Bros. & Dyckman. Gums, cs. 10

Hammill & Booth. Bundles, 44

Hartley & Graham. Boxes, 1

Keidel Moritz. Arms, cs. 27

Knappe H. & Co. Cases, 2

McKinibon. Boxes, 1

Merch. Disp. Co. Cases, 2

Neuse Hesslein & Co. Cases, 2

Schutte W. & Co. Cases, 6

Stoddard, Lovering & Co. Cases, 2

Tucker J. & Co. Cases, 2

Wickson G. & Co. Cases, 2

Wire rods, coils, 4250

Rollers, cs. 27

Steel.

Cooper, Hewitt & Co. Coiled wire rods, rods, 100

Naylor & Co. Sheets, box, 1

# Trade Report.

## General Hardware.

The volume of business in June is generally referred to as fairly satisfactory, and probably aggregating in excess of last year's trade the same month. The present demand is not heavy, but a fair business is doing, and the market is characterized by a hopeful feeling that the trade of the season will be good. With the exception of a few leading lines which are weak and irregular, prices generally are firm, with perhaps a slight upward tendency. Rather more than the usual number of buyers are in the market at this time. The stock of goods in manufacturers' hands is not in most lines as large as usual at this season, and the trade throughout the country are generally regarded as having but limited stocks.

In regard to the report which was mentioned in our issue of the 17th ult. to the effect that the jobbing houses who recently met at Kansas City decided that Chicago jobbers should not sell Hardware west of the Mississippi River, we have received a communication from the secretary of the Mississippi and Missouri Valley Hardware Association, to whose meeting the report referred. After expressing the opinion that the only ground for such a statement was the fact that there was a meeting of Hardware jobbers in Kansas City, the secretary continues:

The annual meeting of the Mississippi and Missouri Valley Hardware Association was held at Kansas City June 1 and 2. The object of this association is to promote the interests of the trade, and by an exchange of ideas and opinions to cultivate a closer and more harmonious relationship among its members. It has not as yet undertaken the task of fencing in the territory west of the Mississippi River, and I am not aware that any of its members have even contemplated so stupendous an undertaking. While the statement of your correspondent "that we had decided that Chicago jobbers should not sell west of the Mississippi River" is almost too absurd to call for a reply, notwithstanding I deem it my duty as secretary of the association to free its members from the imputation that they would be so mean as to deprive their brother merchants of Chicago of the rights and privileges granted by the Constitution. The Hardware jobbers of the Mississippi and Missouri River valleys are pleased to meet their Chicago rivals on any field, and are capable of demonstrating to the merchants of the West and Northwest their ability to get their share of business. In justice to the members of our association, all of whom are your patrons, I trust you will give this communication publicity in your valuable paper. Yours respectfully,

GEO. L. FARWELL, Secretary, &c.

### BARR WIRE.

The New York market has shown all the dullness due to a broken week in an off season, and has been maintained fairly steady. We quote for Four-Point Galvanized Barb Wire, in carload lots, 4½ cents, delivered.

### NAILS.

The New York Nail market remains in practically the same condition. It is pointed out by manufacturers that during the month of July the usual summer stoppages will be even more general and prolonged than in former years, on account of the low prices and the accumulation of stocks on the part of the stronger concerns who were adverse to marketing at the prices prevailing for some time. We quote nominally \$2 to \$2.05 for small lots of Iron Nails from store, with the usual concessions for carload lots.

### MISCELLANEOUS PRICES.

The recent entrance into the market of a number of new concerns making Wire Nails, together with the large capacity of the manufacturers already in the field, has had the effect of weakening somewhat the prices at which this line of goods are held. There is no change in open quotations, but concessions have been made to close buyers. Efforts are, however, being made to check this condition of things and to re-establish the market on these goods. With a view to accomplish this a conference of manufacturers is to be held in this city, and the hope is expressed that the former prices will be again made firm.

There is some irregularity in the price of Rivets, and careful purchasers are often able to obtain the extra discount of 7½ per cent. on small lots. Close buyers are in most cases able also to get material concessions on large lots.

The Screw market continues irregular, and the tendency is toward lower prices. Extras are given by the large and small companies with more freedom.

The Penn Hardware Co., Reading, Pa., advise us that they contemplate making changes in their prices to agree with the advanced quotations of the other manufacturers of Cast Iron Shelf Hardware, to which we referred in our last issue.

The following is the price list of the Machinists' Flexible Steel Scales manufactured by Coffin & Leighton, Syracuse, N. Y., the list being subject to a discount of 25 per cent.:

Length, inch	2	3	4	5	6	7	8
Width, inch	2	3	4	5	6	7	8
Thickness, inch	1-2	1-2	1-2	1-2	1-2	1-2	1-2
Price	\$0.30	40	50	75	1.12		
Length, inch	12	18	24	36			
Width, inch	1	1	1	1			
Thickness, inch	1-16	1-16	1-16	1-16			
Price	\$1.50	2.25	3.00	5.00			

A joint circular of the following manufacturers of Common Carriage Bolts has been issued, dated Cleveland, Ohio, June 30, announcing the withdrawal of all quotations on Common Carriage Bolts:

LAMSON & SESSIONS CO., Cleveland, Ohio.  
HOTCHKISS & UPSON CO., Cleveland, Ohio.  
CHAPIN BOLT AND NUT CO., Cleveland, Ohio.

LAKE ERIE IRON CO., Cleveland, Ohio.  
ARMS BELL CO., Youngstown, Ohio.

PLUMB, BURDICK & BARNARD, Buffalo, N. Y.

SYRACUSE BOLT CO., Syracuse, N. Y.

C. B. HEAD, Pittsburgh, Pa.

OLIVER BROS. & PHILLIPS, Pittsburgh, Pa.

L. M. DAYTON, Cincinnati, Ohio.

MICHIGAN BOLT AND NUT CO., Detroit, Mich.

TOLEDO BOLT AND NUT CO., Toledo, Ohio.

It is also intimated that new quotations will be furnished on application, and it is understood that the new prices will be an advance of nearly 10 per cent. beyond the extreme prices lately prevailing.

It is expected that a meeting of the manufacturers of Coffee Mills will be held this week, when it is intimated as not unlikely that an advance in price will be determined upon.

The following are the prices of the Conical Bolster Spring, manufactured by W. F. Haggard, Lafayette, Ind., which are subject to a discount of 50 per cent.:

No. 1 per set of four.....\$6.00  
No. 2 per set of four.....7.00  
No. 3 per set of four.....8.00

These Springs are alluded to as having an extensive sale in Southern California, and in the fruit-growing districts of Michigan, Ohio and New York, and as meeting the demand of the trade for something simple, cheap and durable in this line.

The following circular relating to Coes' Wrenches has been issued announcing the continuance of present prices:

NEW YORK, July 1, 1886.

We are instructed to confirm existing prices for Coes' Genuine Screw Wrenches of either make, including L. Coes & Co.'s Knife Handle, at 60 per cent. discount from list. "Mechanics" Wrenches, made by L. Coes & Co., and similar quality by A. G. Coes & Co., will continue to rate at 10 per cent. less than the "Genuine." A special discount of 10 per cent. will be allowed on specified orders for 50 dozen for immediate shipment. Terms, 90 days, or 3 per cent. discount for cash in 10 days. Parties having purchased the quantity will be entitled to the extra discount on subsequent orders during balance of season ending December 31, 1886. Above quantity must be taken from either one or the other manufacturer, and includes only the Coes Genuine Pattern or L. Coes & Co.'s Knife Handle, and not the Mechanics made by L. Coes & Co., or a similar quality made by A. G. Coes & Co., the price of either being 10 per cent less than the "Genuine," and are subject to the same quantity schedule.

J. C. McCARTY & CO.,  
Agents for L. COES & CO.  
JOHN H. GRAHAM & CO.,  
Agents for A. G. COES & CO.

Manhattan Hardware Co., Reading, Pa., announce that they are intending to advance prices on goods made by them about 10 per cent. before long.

The New York Supply Co., 50 and 52 John street, New York, issue a price list of the American Steam Gauges, a full line of which they carry in stock. They also issue circulars giving the standard list of Galvanized Malleable Iron Fittings, and describing the North American Injector, of which a reduced price list is given.

The following revised price list of Cordage is issued July 6, and is subject to the usual discount to the trade of 1 cent per pound:

Manila Rope.

Cts. per lb.
1½ inch cir. and upward.....12½
12 thread, or ½ inch diameter.....13
and 16 thread, or 1-4 and 5-16 inch diameter.....13½
Hemp Rope, 2, 3, 4 or 5 thread.....10
Tarred Rope.....14
Tarred Rope and Lath Yarn.....12

Sisal Rope.

Cts. per lb.
1½ inch cir. and upward.....9
12 thread, or ½ inch diameter.....9½
and 16 thread, or 1-4 and 5-16 inch diameter.....10
Hemp Rope, 2, 3, 4 or 5 thread.....9
Tarred Rope.....8
Lath Yarn.....8

Russia Hemp.

Cts. per lb.
White Rope.....17
Tarred Rope and Ratline.....11
Spun Yarn.....10½
Bolt Rope.....18
Marline, Houseline, Rounding and Hambo-line Packing.....15
Packing.....18

American Hemp.

Cts. per lb.
White Rope.....18
Tarred Rope and Ratline.....12½
Spun Yarn.....12
Packing.....12
Marline, Houseline, Rounding and Hambo-line Packing.....16
Sash and Bell Cord.....25 to 35

Italian Hemp.

Cts. per lb.
Packing.....14 to 20
Tarred Rope.....16
Jute.....6½
Rope and Packing.....6½
Cords and Lines.....7½
Oakum.....7½
Best Oakum.....7½
U. S. Navy.....6½
Navy.....6½

Discounts to Dealers.

On 100 bales and over.....14

The following are the prices announced by the Alford & Berkele Co., 77 Chambers street, New York, on Goldman's Patent Atomizer and Sprinkler, a description of which is given among the Hardware Novelties on page 31:

In lots of less than six dozen, per doz.....\$2.50  
Half gross lots, per gross.....\$27.00  
One gross lots, per gross.....\$24.00  
Price.....\$0.30, 40, 50, 75, 1.12  
Length, inch.....12, 18, 24, 36  
Approx. width, inch.....1-16, 1-16, 1-16, 1-16  
Thickness, inch.....1-16, 1-16, 1-16, 1-16  
Price.....\$1.50, 2.25, 3.00, 5.00

The Hunter Sifter Mfg. Co., Cincinnati, Ohio, and 35 Murray street, New York, issue an attractive pamphlet calling attention to their special machinery for bakers, millers, grocers, &c., in which the different machines they manufacture are illustrated and described. They also issue a special notice that, owing to the increase in the price of skilled labor and materials, and the large number of improvements recently made on their Machines, on September 1, 1886, and thereafter, the net prices of Lightning Sifters and Mixers will be advanced to prices given in their circular. They also sent out an attractive Mikado advertising card relating to the Hunter Sifter, furnishing with it an easel on which it may be placed.

### ITEMS.

W. S. Rathbone, the trade will learn with regret, has been compelled by ill-health to withdraw from the firm of Buhl, Sons & Co., Detroit, Mich., with whom he has been connected for the past 15 years. The appreciation in which he is held by his late associates is evidenced by the fact that he was presented on his retirement with a fine Colt's Hammerless Shotgun. It is expected that relaxation for a while from the pressure of close application to business will restore Mr. Rathbone to his accustomed health.

The Conroy Refrigerator Door Fastener, manufactured by P. J. Conroy, Philadelphia, has been on the market only a short time, but is referred to as appearing to meet the wants of the trade. The advantages claimed for it are that when opening the door the handle is lifted, which throws the door open, and in closing, by pushing the handle down, the door is closed exceptionally tight.

We are requested to announce that Pratt & Craig, of Des Moines, Iowa, have sold their entire stock of Hardware, &c., to Peavey Bros., Sioux City.

F. Roloson, Baltimore, Md., issues a new catalogue describing his improved Dry Air Refrigerators, and in connection therewith refers to some of the uses for which his varied line is especially adapted, and gives a large number of references.

Our readers will observe the advertisement on page 18, in which a line of Roller Skates is offered at special prices. The opportunity may be worthy the attention of the trade.

Kelly, Waus & Co., Chicago, have just completed their new catalogue of Heavy Hardware, Wagon and Carriage Irons, Wagon, Carriage and Implement Wood Stock, Handles, Vises and Blacksmiths' Tools, which will be distributed to the trade with goods ordered.

G. M. Brubaker & Polk, of Millersburg, Pa., manufacturers of "Common Sense" Screw Plate Machinist's Hand, Machine, Blacksmith's Taper, Gas and Steam Fitters Taps, Machine Screw Taps and Screw Plates and Dies, Rivet Sets, Cast-Steel Cold Chisels, &c., have appointed James E. Halsey agent for the sale of their goods. Mr. Halsey is now located with Geo. B. Curtis at 60 Chambers street, New York City, agent for Beatty's Cleavers and Edge Tools, Chapin's Rules, "Custer" Scale Beams, Lamson & Sessions Co. Wrenches and Carriage Bolts, &c. Mr. Halsey would be pleased to see his many friends at his new location.

George H. Sargent, of Sargent & Co., sails on Saturday on the steamer Rhine-lander for Antwerp.

Announcement is made of the dissolution by mutual consent of the co-partnership heretofore existing between Joseph H. Jackson and Charles T. G. Chase, under the firm name of J. H. Jackson & Co., 206 and 208 Franklin street, New York. J. H. Jackson, who will sign in liquidation, will continue the Iron and Steel business at the same location.

In advance of the issue of the complete catalogue the George D. Winchell Mfg. Co., send us a list of their line of Coal Vases, Coal Hods, &c., to the completeness of which they allude, as well as to their production of goods of superior quality and finish and artistic decoration. The circular also illustrates their new Keystone Chamber Set, a recent addition to their line, to the elegance of which they call attention.

The Findlay Stave and Handle Co., Findlay, Ohio, issue circulars relating to their line of Bent Shovel, Spade, Scoop, Hay, Rake and other farming tool Handles, in which the extensive line of these goods is enumerated, with list prices.

With reference to the demand for Copper Rivets and Burrs in assortments, which has been alluded to in these columns, Wallace & Sons, 89 Chambers street, announce Rivets, assortments, lengths, ½ to 1½ inch, with Burrs to match, in 1-pound or half pound paper boxes, and in solid cases of 100 pounds. We are also informed that the Rome Iron Works, Rome, N. Y., are also putting them up in a similar manner.

LOGAN & STROBRIDGE,

New Brighton, Pa., issue a new attractive and complete illustrated catalogue showing their line of Coffee Mills, Hand and Power, Corn, Rice and Spice Mills, Builders' Hardware and House Furnishing Goods and Specialties. On these lines list prices are given, with descriptions, and the following discount sheet is issued as applying to the catalogue. It will indicate in detail the

goods manufactured by this house and the prices at which they are quoted. It is subject to a discount of 2 per cent. for cash in 10 days:

Dis. per cent.

Coffee Mills.....45	Joint Ends, long, 7-16 round, 9-16 oval, per set, 25¢
Anchor Side Mills.....40½	Joint Ends, long, ½ in. round, ¾ oval, per set, 27¢
Steaming Coffee Mills.....45	Joint Ends, long, ½ in. round, ¾ oval, per set, 27¢
Cracker Mill.....45	Joint Ends, long, ½ in. round, ¾ oval, per set, 27¢
Domestic Corn Mill.....40½	Joint Ends





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**ILLINOIS IRON AND BOLT CO.,**

20 to 26 Main St., CARPENTERSVILLE, KANE CO., ILL.

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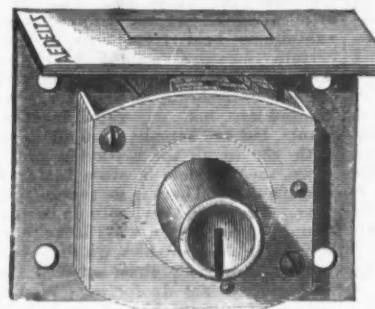
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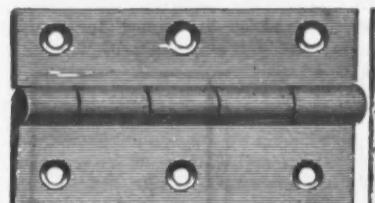
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**RIFLE**  
Is the Favorite  
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SEND FOR  
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E. MERRITT & CO.  
ESTABLISHED 1859 → BROCKTON, MASS.  
The Only Manufacturers of a Complete Line of  
**TACK AND NAIL MACHINERY.**  
SEND FOR CIRCULAR UPRIGHT DRILLS.

**A. E. DEITZ.**J. C. McCARTY & CO., Agents,  
97 Chambers and 81 Reade Sts.,

NEW YORK.

Factory, BROOKLYN, E. D., N. Y.

**W. & J. TIEBOUT,**  
MANUFACTURERS OF  
BRASS, GALVANIZED & SHIP CHANDLERY**HARDWARE.**Nos. 16 & 18 Chambers Street,  
NEW YORK.

ALWAYS GIVES THE  
UTMOST SATISFACTION.  
**Main Belting Co.,**  
Manufacturers of  
THE LEVIATHAN  
**COTTON**  
**BELTING.**  
Unsurpassed for  
Strength, Durability and  
Cheapness.  
Made to any Length,  
Width and Strength.  
**Main Driving Belts.**  
Guaranteed to Run  
Straight, Even Through-  
out.  
No Cross Joints, Un-  
affected by Heat, Damp,  
Cling well to the Pulley,  
Held so equal. In fact,  
is THE BELT.  
**MAIN BELTING**  
**COMPANY,**  
S. W. cor. Ninth and New  
Sts., Philadelphia.  
Also  
24 East Randolph St.,  
CHICAGO.

**THE CHAMPION LEVER**  
**BLOWERS & FORGES**

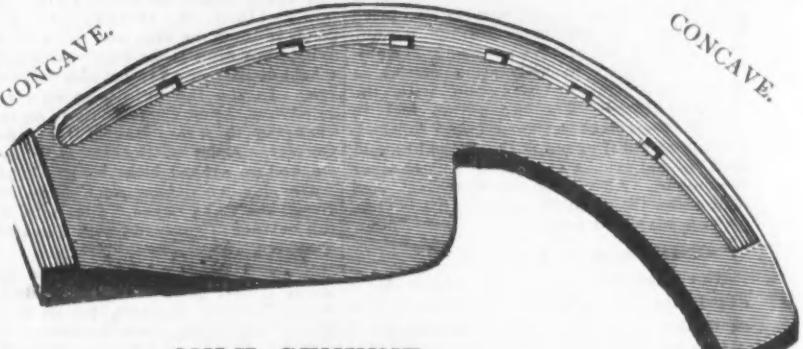
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An entirely novel  
construction. "They  
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Cog Wheels, Ratchets,  
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**CHAMPION BLOWER & FORGE CO.,**  
Corner Cherry and James,  
LANCASTER, PA.USE THE **MASON**  
Pressure Regulator  
FOR STEAM PUMPSUSE THE **MASON** SPEED GOVERNOR  
FOR STEAM PUMPS.THE MASON REGULATOR CO.,  
Manufacturers of Steam Traps, Pressure Regulators  
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22 Central St., Boston, 115 Liberty St., New York.

F. DEMING,

BUILDER OF

**SPECIAL MACHINERY,**  
WATERBURY, CONN.**"GREENFIELD" FORGED OX SHOE.**

ONLY GENUINE.

Made under the Parker and Colburn Patents, from Burden's H. B. and S. Iron. Nail holes punched, and every shoe perfect. The Parker and Colburn Patents cover broadly the dies in which the shoes are forged. We are the only licensees, and all parties are cautioned against using either of the dies or the forging mechanisms or processes so protected, as our rights under said patents will be fully maintained.

We can furnish either the Concave Shoe with One Calk, or the Flat Shoe with Two Calks, we emphatically recommend the Concave Shoe with one Calk, for the following reasons:

First.—Because the entire bearing of the shoe should come upon the shell of the hoof, and not upon the ball or tender part of the foot, as is necessarily the case with the flat shoe. This principle is recognized by all experts in shoeing both of oxen and horses, and will prevent a tendency to sore-footedness.

Second.—Because by having one Calk only, the shoe can make the other Calk at any angle he desires.

Third.—Because by having one Calk only, the shoe can make the other Calk at any angle he desires.

No. 1. Full Length, Concave, 5 inches, Weight, per Set of Eight Shoes, 3 pounds.

" 2. " " 5½ " " 3½ " "

" 3. " " 6 " " 4 " "

" 4. " " 6½ " " 5 " "

Packed in boxes or kegs of 100 pounds, half each rights and lefts. Full weight, and no charge for packages

— PRICES —

For orders of One Ton, or more, 9 cts. per pound. For orders of 500 lbs., or more, 10 cts. per pound.

1000 lbs. " 9½ " less than 500 lbs., 10½ "

Terms, Net Cash, 30 days.

Made only by

**MILLERS FALLS CO.,**  
74 CHAMBERS ST., NEW YORK.**CHAMPLAIN**  
Forged Horse Nails.MANUFACTURED BY THE  
**NATIONAL HORSE NAIL CO.,**  
Vergennes, Vermont.

HOT FORGED AND COLD HAMMERED POINTED MADE OF BEST NORWAY IRON AND WARRANTED.

WAREHOUSE  
97 CHAMBERS AND 81 READE STREETS NEW YORK.  
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H. SEIDEL.

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Sec. and Treas.**THE SEIDEL & HASTINGS CO.**

WILMINGTON, DELAWARE,

New York Office, No. 221 Pearl, Corner Platt Street,

MANUFACTURERS OF

**BEST CHARCOAL BOILER PLATES,**  
AND PLATE IRON GENERALLY.  
ALSO BEST QUALITY HOMOGENEOUS STEEL PLATES.

We ask the special attention of the trade to our C. H. No. 1 Boiler Plates, which we manufacture expressly for the Shells of Steam Boilers and stamp 50,000 pounds T. S. when desired. One hundred and sixteen tests of this iron, made during the last three years by the U. S. Inspectors of Steam Vessels, show an average tensile strength of 58,308 pounds to the sectional square inch, and an average reduction of area of the fractured section of 30% per centum. Our prices are as low as the production of a good article will admit of.

**POTTSVILLE IRON & STEEL CO.,**

POTTSVILLE, PA., Manufacturers of all kinds of

**STRUCTURAL STEEL AND IRON,**Viz., BEAMS, CHANNELS, TEES, ANGLES, PLATES AND BARS; Also STEEL  
AND IRON AXLES FOR FREIGHT AND PASSENGER CARS.

This Steel is manufactured by the CLAPP-GRIGGITHS process, and is specially adapted, in addition to the above, for Boiler and Bridge Rivets, Wire Rods, Nail Plates, &amp;c. &amp;c. Our Mild Steel is well adapted for use in place of the best quality of wrought iron; where a greater strength and ductility is required, it welds readily as iron. Also Sillers, Slabs of all sizes and any desired temper. Shafting of all sizes in stock, from which prompt shipments can be made.

Brewery, Malt and Ice House Construction a Specialty.

**Duggan-Parker Hardware Mfg. Co.**  
ST. LOUIS, MO.

**PURE TURKISH EMERY.****WALPOLE EMERY MILLS,**  
South Walpole, Mass.

## MECHANICAL.

**Centrifugal vs. Reciprocating Pumps.**

Mr. William O. Webber's paper on "The Relative Efficiency of Centrifugal and Reciprocating Pumps," presented at the recent meeting of the American Society of Mechanical Engineers, at Chicago, contains information of value to all interested in pumping machinery. Accordingly, we take from it the following particulars:

Until quite recently very little has been done to perfect centrifugal pumping machinery in the United States. There are no well-authenticated experiments recorded by American engineers containing all the necessary data for comparison with other types. The situation in Europe is better; in 1883 pumps constructed on the Gwynne system gave under a lift of 14.7 feet an efficiency of 61.3 per cent. of useful effect. The term "efficiency" here used indicates the value of

$$\frac{W.H.P.}{I.H.P.}$$

and does not therefore show the full efficiency of the pump, but that of the combined pump and engine. It is, however, a very simple way of showing the relative values of different kinds of pumping engines having their motive-power forming a part of the plant. Several diagrams have been prepared illustrating this subject, which are presented as representing the results of experiments made with the two types of engines which are being considered. It may be of interest to insert here the following description of the testing apparatus used by Mr. Webber in determining the efficiency of the belted centrifugal pumps.

Referring to Fig. 1, *a* is a pump in position to be tested, and is bolted down to the floor over the tank *g*; *o* is the strainer on lower end of suction-pipe; *n* is the gate-valve in the discharge-pipe, to be closed when using the injector *h* in exhausting the air from the pump, so as to prime it; a taper expander, *i*, is used on the discharge-pipe, tapering from 5 to 6 inches, this being found to act something like a taper draft tube on a water-wheel, increasing the efficiency of pumps so connected from 2 to 5 per cent.; the pipes *j* and *j'* are wrought-iron tubing, such as ordinarily used in piping, and the elbows *k* are the long turn elbows especially designed for automatic sprinkler purposes, and are used here in preference to ordinary elbows, owing to the great loss of power in driving water around such short corners.

The power being used is transmitted by the counter-shaft *f* from the main line to the balance transmitting dynamometer *b*, which carefully weighs the power being used by the pump *a*. The water being pumped from the tank *g* passes up through the diffusing-box *c*, where its velocity is retarded, and the solid round stream is broken up and spread out into a thin sheet by the inclined shelves shown in dotted lines, and the water then delivered in a broad sheet, but with the velocity due only to its own weight in falling into the weir-box *e*, at the front end of which is the weir proper *c*, having an opening of 48 inches in width, and a depth of water below the crest of the weir equal to three times that of the stream flowing over it. At the proper distance back from the crest is the hook gauge *d* for measuring the depth, and still further back are the smoothing racks *i* to retard and quiet the flow of water. In making a test, after exhausting the air and starting the pump the valve *n* is opened and water is discharged in a continuous stream through the pipes into the weir-box *e*, and then falls again in a sheet into the tank *g*, and is thus pumped over and over.

In calculating the efficiency of pump the cubic feet of water passing over weir, measured by the hook gauge, being converted into pounds by multiplying by 62.5, is again multiplied by the height from level of water in tank *g* when the pump is running to the center of the horizontal discharge-pipe *j* at top of testroom, and the foot-pounds so obtained divided by 33,000 equals the water horse-power being developed. The power used to do this work is measured by the dynamometer, and (minus the friction of the dynamometer itself, which is in every test weighed and deducted,) equals the dynamometer horse-power; the water horse-power being divided by the dynamometer horse-power equals the efficiency of the pump being tested, or to formulate:

$$\frac{W.H.P.}{D.H.P.} = E^*$$

Fig. 2 was prepared by plotting the values *W.H.P.* as found in the various tests of *I.H.P.* as found in the various tests made to determine the duty of some of the best designed reciprocating pumping engines of bucket and plunger, piston type, &c. The highest value of this term with which Mr. Webber is familiar is 0.9163 for a lift of 170 feet, and 3615 gallons per minute. This was obtained in a test of the Leavitt pumping engine at Lawrence, Mass., July 24, 1879, made by Richard H. Buel, C. E., the following being the results obtained during the duty trial:

Duration of trial ..... 15.1 hours  
Pounds of wood used to start fires ..... 400  
Of coal put into furnaces ..... 3500  
Of coal withdrawn from furnaces at end of trial ..... 27  
Of coal consumed .....  $(400 \times 0.4) + (3500 - 27) = 3,633$   
Pressure in main, by gauge ..... 64 lb per sq. in.  
Water level in well below gauge ..... 29 (6 feet)  
Water pressure .....  $(29.05 \times 0.433) + 64 = 76.6$  lb per sq. in.

Average revolutions per minute ..... 556.0465 sq. in.  
Revolutions of engine ..... 12.337

Duty of engine .....  $\frac{556.0465 \times 8 \times 12.337 \times 76.6 \times 100}{8.838} = 111,548.925$

Average revolutions per minute ..... 18.62

Suction pressure by gauge ..... 89.5 lb per sq. in.  
Vacuum ..... 2.7 in.

Barometer, inches ..... 29.81

Temperature of engine-room ..... 79°

Temperature of flame ..... 359°

Total quantities 1 cu. ft. of coal ..... 0.033

Pounds of ashes ..... 0.223

Pounds of combustible ..... 3.410

\* In order to avoid confounding the tests of two types of pumps—i.e., those coupled direct to engine and those driven by belt—the expressions *W.H.P.* = *E* will be used for the former, and

*W.H.P.* = *E*<sup>2</sup> for the latter.

*D.H.P.* = *E*<sup>2</sup> for the latter.

Feet of feed water	36,900
U.S. gallons of water pumped per 24 hours, calculated from pump capacity	4,401,372
Per cent. of ashes	6.14
Hourly quantities: Pounds of coal	341
Pounds of combustible	26
Pounds of coal per sq. ft. of grate	8.38
Pounds of combustible per do.	7.86
Pounds of heating surface per do.	0.296
Pounds of feed-water	2,427
Evaporation: Pounds of water per pound of coal, at observed temperature and pressure	10.18
Per pound of combustible do.	10.79
Per sq. ft. of heating surface per hour do.	2.39

other the result of tests made with centrifugal pumps. As in the first type considered, there is a lift at which we find centrifugal pumps giving a maximum efficiency, while for lifts above or below this the efficiency decreases. The lift at which the maximum efficiency is obtained in the latter case is approximately 17 feet. At lifts from 12 to 18 feet some makers of large experience claim now to obtain from 65 to 70 per cent. of useful effect. As already stated, 0.613 is at present the best done at a public test

pumps at high lifts is because the first factor is so large a proportion of the work done, for if a certain number of gallons is to be raised in a given time to a given height our only hope for high efficiency lies in making the friction of the water through pipes and pump, as well as the friction of the pump itself, a minimum. Here is where a change in style of pump on low lifts is taking place. The water in passing through or passing over the disk of a centrifugal pump meets with almost no resistance in the shape of valves to be opened, corners to be turned sharply and contracted passages, so often found in the common piston pump. Again, the friction of the pump itself is confined entirely to what is generated by the revolving shaft in two or sometimes three bearings, and it is well known that a revolving shaft is the most easily lubricated of any form of bearings. Again, the friction of motion being less than that of rest, a slight advantage seems to be gained in the continually revolving shafts over the stops and starts of a reciprocating pump. Besides this, there is also to be considered the subject of shocks and jars of large masses of water moving at variable velocities, as well as the freedom from an air cushion on the piston in a centrifugal pump. These are some of the more important reasons to account for what we find to exist, namely, that for lifts up to 34 feet water can be handled more efficiently by centrifugal than by piston pumps. There is this point which may be worth considering in connection with the point at which the curves of efficiencies cross. It appears to correspond with the head of water which is supported by the atmospheric pressure, and it has been suggested that centrifugal pumps will give higher efficiencies than piston pumps just as long as they can depend upon the help of the atmosphere, but when this help is not available a direct push seems the proper thing.

Having considered thus far the comparative value of the two types from the efficiencies alone, we might now look at some other points of importance to the user of any apparatus for raising fluids. Under this head we shall consider the following subjects: 1, comparative weights; 2, first cost; 3, annual costs; 4, ease in handling. The drainage pump constructed some years ago for the Haarlem Lake were designed to lift 70 tons per minute 15 feet, and they weighed about 150 tons. Centrifugal pump for the same work weigh only 5 tons. The weight of a centrifugal pump and engine to lift 10,000 gallons per minute 35 feet high is

000,000 gallons per 24 hours, on a mean lift of about 10 feet (maximum of 12.5 feet).

The diagrams of Fig. 3 dispose of the third item, while the last items are surely not greater than for piston pumps. It is fair to say that Fig. 4, showing relative prices of the two types up to a capacity of 600 gallons per minute, and were plotted out direct from catalogues of well-known makers of each style. The writer not having access to any reliable data of time performances of direct-action steam pumps generally in use for tank and similar work, can make no graphical comparison between these and centrifugal pumps. Having made some 70 or 80 experiments on efficiencies of centrifugals, lifts from 5 to 50 feet, and capacities from 50 to 1500 gallons per minute, measured by a dynamometer, it would be very useful to have some information concerning the former class for comparison in the smaller sizes, and we would be glad to see some published reliable results under this head.

Fig. 5 shows two efficiency curves for different velocities, plotted from tests made of two pumps with 5 inch discharge apertures. These tests were made under an average elevation of 17 feet, the pumps in both cases drafting about 9 feet and discharging 8 feet higher. The upper curve *a b* was the result of tests made by a pump that was very clean and smooth inside. The lower curve *c d* was made by a pump in which, through carelessness in the foundry, the core-sand had been allowed to burn into the inside face of volute or casing and water passages. The difference between these two curves (which, by the way, are remarkably uniform) shows the absolute necessity of having the inside of all such pump castings very smooth and free from the slightest roughness. Both of these pumps were taken at random from stock, and were in nowise especially prepared for these tests. These tests seem to show that the efficiency rises very gradually and uniformly until the water reaches a velocity equal to 11 $\frac{1}{2}$  feet per second. The highest efficiency with this size pump seemed to equal a velocity of 12 feet per second, after passing which point the efficiency falls very rapidly.

Mr. Webber has other series of tests in progress, not quite completed, which he proposes to embody in another paper on "Centrifugal Pump Efficiencies," which seem to show that the efficiency of centrifugal pumps increases as the size of the pump increases, and which might be approximately stated as follows: That a 2 inch pump—this

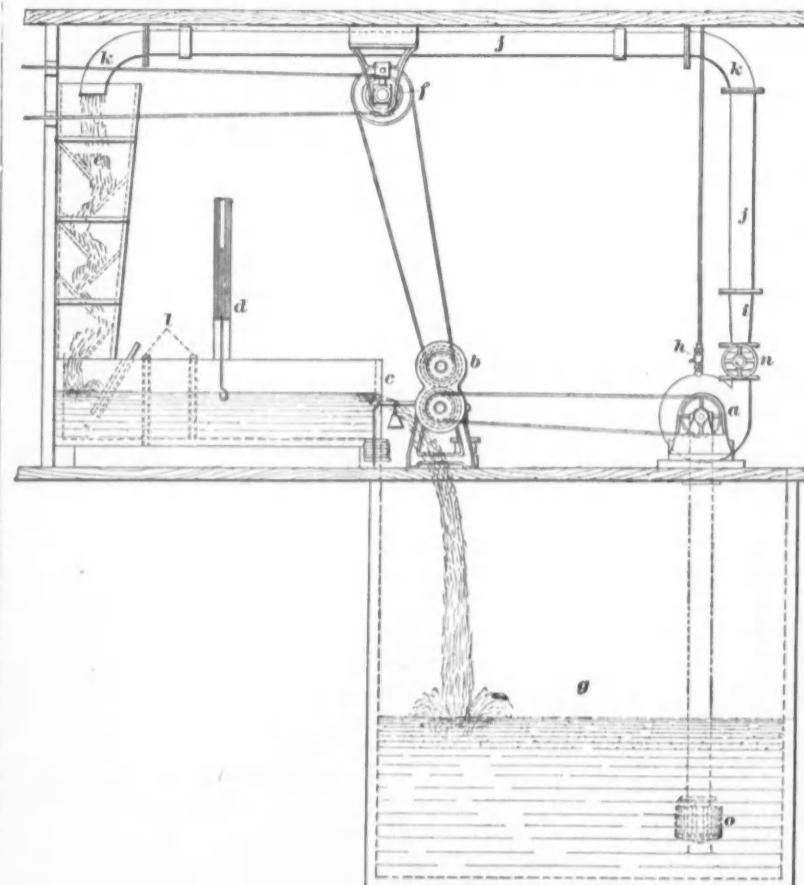


Fig. 1.—Arrangement of Testing Apparatus.

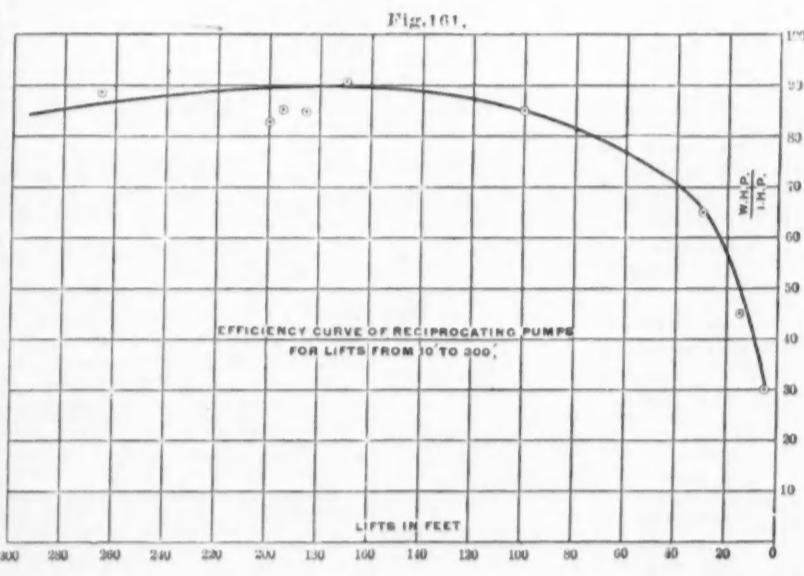


Fig. 2.

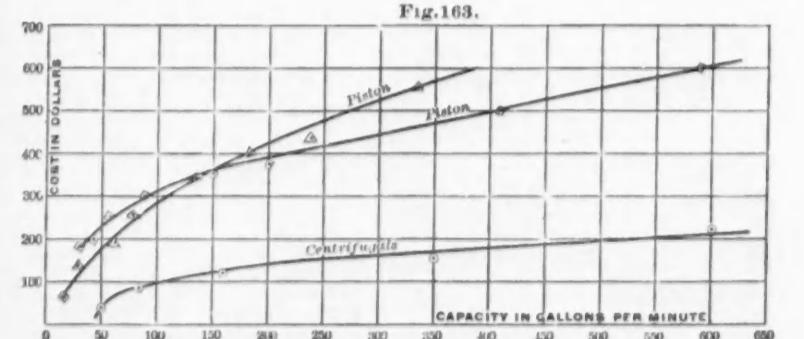


Fig. 3.

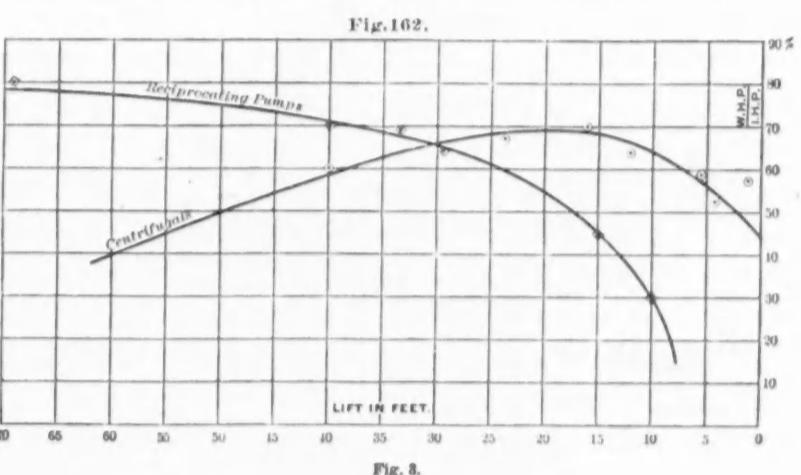


Fig. 4.

Figs. 2, 3, 4 and 5.—Diagrams of the Relative Efficiency and Price of the Two Types of Pumps.

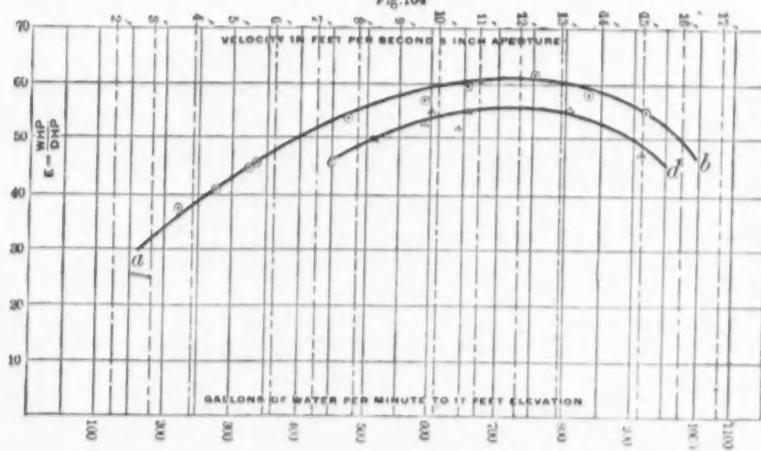


Fig. 5.

THE RELATIVE EFFICIENCY OF CENTRIFUGAL AND RECIPROCATING PUMPS, FROM EXPERIMENTS BY W. O. WEBBER.

Per pound of coal from and at 312° ..... 11.49  
Per pound of combustible per do. ..... 12.24  
Per sq. ft. of heating surface per hour do. ..... 2.71  
Horse-power: Net (calculated from water pressure) ..... 125.55  
Indicated ( $\frac{125.55}{0.91643}$ ) = ..... 147.91  
Pounds of coal and water per hour per horsepower: Coal, per net horse-power ..... 1.78  
Per indicated horse-power ..... 1.63  
Feed-water, per net horse-power ..... 17.98  
Per indicated horse-power ..... 16.48

For higher lifts than 170 feet the curve of efficiencies falls, and from 200 to 300 feet the average value seems to be about 0.84 per cent. Below 170 feet the curve also falls reversely and slowly, until at about 90 feet its descent becomes more rapid, and at 35 feet 0.727 appears the best recorded performance. There are not any very satisfactory records below this lift, but some figures are given for the yearly coal consumption and total number of gallons pumped by engines in Holland under a 16-foot lift from which an efficiency of 0.44 has been deduced. An interesting collection of information was published in 1883 by an Italian engineer, Signor Cuppari, concerning pumping engines in Holland, which will be found useful in this branch of hydraulics.

Fig. 3 contains two curves, one transferred from Fig. 2, on a different scale; the

under 14.7 feet head. Some very carefully conducted trials of 31-inch centrifugals recently made at Fes Bouches du Rhone gave the following results:

Lifts: 4.13 feet. 4.51 feet. 5.36 feet. 5.46 feet.  
*W.H.P.* ..... 0.585  
*I.H.P.* ..... 0.555 ..... 0.567 ..... 0.579

From the above we see that the efficiency rises with the head in feet, so far as the experiments go. In all the curves thus far considered the amount of water pumped has been large, 18,000,000 to 100,000,000 gallons or 231 cubic inches in 10 hours. Above a 20 foot lift for centrifugals, and below 35 feet for reciprocating pumps, experiments of value seem to be sadly deficient. It is, however, probable that the curves shown on Fig. 3 approximate the relation between the two types under consideration. Let us see what these two lines say. The work done in taking water from one level and placing it at a higher level is divided into three important parts: (a) lifting a certain number of gallons or pounds a given number of feet high; (b) overcoming the friction of the water through the pipes and pump; (c) overcoming the friction of the moving parts of the pump and engine due to the load imposed.

The reason why we are able to obtain such high efficiencies with reciprocating

6 tons. This lift is the same that the Boston Sewage System station pump is at work against; but the latter capacity is double the 10,000 gallons per minute, and the proportionate weight for a centrifugal pump would be 12 tons. We have not at hand the actual weight of the Boston pump, but it must be many times 12 tons.

Fig. 4 shows the relation between the two types as regards the prices, the upper two curves showing the prices of piston pumps to raise different amounts of water. The lower line gives the same for centrifugal pumps, from which we deduce this approximation: first cost of centrifugal pump =  $\frac{1}{4}$  first cost of piston pumps for the same duty. The annual costs include several items, the more important of which are: 1, interest on investment; 2, depreciation in value; 3, heat-units used up in running pump per hour; 4, oil, care, repairs, &c. For low lifts up to 40 feet each above item is lower for the centrifugal pump. The pumps placed by Gwynne at the Ferrara Marshes, Northern Italy, in 1885, are still in working order, and seem good for a long time to come. These pumps are probably capable of handling more water than any other set of pumping engines in existence. The work performed by these pumps is the lifting of 2000 tons per minute, over 600,

designations meaning always the size of discharge outlet in inches of diameter—giving an efficiency of 38 per cent., a 3 inch pump giving 52 per cent., and a 4-inch pump giving 55 per cent., were



Lawn Mowers.	dis 50 & 5 \$
Standard Machines.	dis 50 & 10 @ 60 %
Cheaper Machines.	dis 50 & 10 @ 60 %
<i>Specified</i> .	
Porcelain Lined, No. 1.	W. doz. \$6.00, dis 25 & 30 \$
Wood, No. 2.	W. doz. \$3.00, dis 35 & 45 \$
Wood Common.	W. doz. \$1.70, dis 15 & 17 \$
Dunlap's Improved.	W. doz. 25 & 30 \$
Summer's, No. 1, \$5. 25; No. 2, \$15. 12; \$18. 12 \$	W. doz. 25 & 30 \$
Jennings' "Star."	W. doz. \$2.50
The "Boss."	W. doz. \$2.50
De's.	Nos. 1, W. doz. \$0.50; 2, \$0.35; 3, \$0.30
Little Giant.	W. doz. \$0.50
King.	W. doz. 40 & 5 %
<i>Lines.</i>	
Cotton and Linen Fish, Drapers.	dis 50 %
Draper's Chalk.	W. doz. \$0.50
Draper's Mason's Lines.	34 ft., No. 1, \$1. 25; No. 2, \$1. 75
<i>Iron.</i>	
Meriden Head, Galvanized.	No. 5, \$3.25; dis 25 & 30 \$
Boiler Tube.	W. doz. 40 & 5 %
<i>Planes and Plane Irons.</i>	
Molding.	dis 15 & 2 \$
Bench, First Quality.	W. doz. 20 & 22 \$
Bench, Second Quality.	W. doz. 22 & 24 \$
<i>Iron Planes.</i>	
Bailey's Stanley R. & L. Co.	dis 20 & 10 %
The Stanley (S. R. & L. Co.).	dis 20 & 10 %
Steer's Iron Planes.	W. doz. 15 & 20 %
Meriden Mat. Iron Co.'s Iron Planes.	dis 20 & 10 %
<i>Diamond Iron Planes.</i>	
Piano Irons.	W. doz. 20 & 10 %
Plane Irons.	W. doz. 20 & 10 %
Plane Irons, Butcher's.	W. doz. 25 & 30 %
Plane Irons, Buck Bros.	W. doz. 25 & 30 %
Plane Irons, Middlesex Mfg. Co.	W. doz. 25 & 30 %
<i>Single and Cut.</i>	
Double.	W. doz. 25 & 30 %
L. & J. White.	W. doz. 25 & 30 %
<i>Pliers and Nippers.</i>	
Button's Patent.	dis 30 & 10 @ 40 %
Gas Tongs.	dis 45 & 50 %
Stilman's Patent.	dis 45 & 50 %
Common Lever.	W. doz. 25 & 30 %
Leach's.	W. doz. 25 & 30 %
Nash's.	W. doz. 15 & 20 %
Reed's.	W. doz. 25 & 30 %
Richardson's Circular.	W. doz. 25 & 30 %
Richardson's X-Cuts.	W. doz. 25 & 30 %
Griffith's Special Steel Diamond X Cuts.	W. doz. 32 & 34 %
Atkins' Champion and Electric Tooth Cuts.	W. doz. 32 & 34 %
Griffith's C.S.	W. doz. 32 & 34 %
Griffith's Solid Cast Steel.	W. doz. 32 & 34 %
R. R. Good's.	W. doz. 32 & 34 %
Atkins' Shingle, Mulay, Drag, &c.	W. doz. 32 & 34 %
W. M. & C. Hand.	dis 30 @ 30 & 3 %
W. M. & C. X Cuts, Thru Back.	W. doz. 32 & 34 %
Peace Circular and Mill.	W. doz. 32 & 34 %
Peace Hand Panel and Rip.	dis 20 & 10 @ 20 & 25 %
Peace Cross Cut, Standard.	W. doz. 32 & 34 %
Peace Cut, The Best.	W. doz. 32 & 34 %
Peace Band Saws, all widths.	W. doz. 20 & 10 %
Richardson's Circular.	W. doz. 20 & 10 %
Richardson's X-Cuts, No. 2, 272; No. 3, 256.	W. doz. 20 & 10 %
Boynton's Lightning Panel, Planer, &c.	W. doz. 20 & 10 %
Boynton's Lightning One Man X Cuts.	W. doz. 20 & 10 %
Boynton's Lightning Buck Saws.	W. doz. 10 & 10 %
Hack Saws.	
Grimm's Hack Saws, complete.	dis 40 & 10 @ 60 %
Grimm's Hack Saw, Bladest only.	dis 40 & 10 @ 50 %
Star Rock Saws and Blades.	dis 25 & 30 %
Hammer Saws and Blades.	dis 25 & 30 %
Saw Frames.	
White, Vermont.	W. gro. \$1.60 @ 11 \$
Red, Polished and Varnished.	W. doz. \$1.50, dis 10 & 15 %
Saw Rods.	W. doz. 10 @ 10 & 10 %
Saw Sets.	
Smith's Genuine.	W. doz. \$5.00 and \$7.75, dis 40 & 5 %
Stillman's.	W. doz. \$5.25 and \$8.00
Common Lever.	W. doz. \$2.00, dis 40 & 5 %
Leach's.	W. doz. \$1.50, dis 15 @ 20 %
Nash's.	W. doz. \$1.50, No. 1, \$1.50, No. 2, \$1.50
Reed's.	W. doz. \$1.50, No. 1, \$1.50, No. 2, \$1.50
Richardson's.	W. doz. \$1.50, No. 1, \$1.50, No. 2, \$1.50
Griffith's.	W. doz. \$1.50, No. 1, \$1.50, No. 2, \$1.50
W. M. & C. Hand.	dis 30 @ 30 & 3 %
W. M. & C. X Cuts, Thru Back.	W. doz. 32 & 34 %
Peace Circular and Mill.	W. doz. 32 & 34 %
Peace Hand Panel and Rip.	dis 20 & 10 @ 20 & 25 %
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Peace Band Saws, all widths.	W. doz. 20 & 10 %
Richardson's Circular.	W. doz. 20 & 10 %
Richardson's X-Cuts.	W. doz. 20 & 10 %
Griffith's Black Iron.	dis 50 & 10 %
Griffith's C.S.	dis 50 & 10 %
Griffith's Solid Cast Steel.	dis 50 & 10 %
R. R. Good's.	dis 50 & 10 %
Atkins' Hollow Back X Cuts.	W. doz. 32 & 34 %
W. M. & C. Hand.	dis 15 @ 15 & 10 %
W. M. & C. X Cuts, Thru Back.	W. doz. 32 & 34 %
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Richardson's X-Cuts.	W. doz. 20 & 10 %
Griffith's.	W. doz. 20 & 10 %
W. M. & C. Hand.	dis 15 @ 15 & 10 %
W. M. & C. X Cuts, Thru Back.	W. doz. 32 & 34 %
Peace Circular and Mill.	W. doz. 32 & 34 %
Peace Hand Panel and Rip.	dis 20 & 10 @ 20 & 25 %
Peace Cross Cut, Standard.	W. doz. 32 & 34 %
Peace Cut, The Best.	W. doz. 32 & 34 %
Peace Band Saws, all widths.	W. doz. 20 & 10 %
Richardson's Circular.	W. doz. 20 & 10 %
Richardson's X-Cuts.	W. doz. 20 & 10 %
Griffith's.	W. doz. 20 & 10 %
W. M. &	



### Comparisons of Blast Furnace Records.\*

The present paper is merely a continuation of the discussion upon the former one, "The Operation of the Warwick Furnace from August 27, 1880, to September 1, 1885," and is intended more as an opening of the renewed discussion than as an independent paper. Naturally, those acquainted with the physical condition of the ore used at Warwick Furnace generally attribute the "dirt troubles" to comminuted stock. But, as explained in Mr. Cook's discussion of the paper, no material amelioration of the annoyance resulted from the employment of coarse ore. Few iron ores are charged into blast furnaces which do not, in handing from the stock piles to the top of the stack, dumping upon the bell or into the furnace, or descending through the shaft of the furnace, produce more or less fine ore; and it is possible that, in some of the softer ores used at Warwick Furnace, the amount of such finely-divided ore was greater than usual, but that it was not sufficiently so to make this particular furnace an exception to all others in the neighborhood is hardly debatable. Nor was the proportion of small ore as great as is charged into other American blast furnaces. Anthracite coal, too, loses some sharp angles by attrition, and when subjected to sudden changes of temperature decrepitates, the various qualities differing in the degree of decrepitation. But, as the coal used at Warwick Furnace was of medium hardness, this should not have a material bearing upon the "dirt troubles." Neither is it probable that the change in stock, traveling so that its temperature would not be raised at most over 200° F. per hour, would cause such decrepitation as would be sufficient to rapidly destroy the coal. Besides, other furnaces using similar stock consumed fully as much fuel, although perhaps with smaller output, without the annoyance caused at Warwick Furnace.

At some of the furnaces using fine Cornwall ore troubles from dirt accumulation occur periodically with remarkable uniformity as to time. One manager informs me that these disturbances could be expected every 10 or 15 days, and the cinder notch invented by Mr. H. C. Grittinger was designed largely for the removal of this accumulated material. This, however, may possibly be owing as much to the distribution of stock at the tunnel-head as to anything else, and does not necessarily follow lower fuel consumption.

As the physical value of the various fuels for blast furnaces appears to be proportionate to the surface exposed, it is possible that any decrepitation would work advantageously, rather than the reverse, by exposing a greater amount of surface to the oxygen of the blast. There does not seem sufficient testimony offered to sustain a theory that fine ore or coal, or both combined, caused the dirt troubles mentioned at Warwick Furnace; and, while giving full consideration to the possibility of these augmenting the trouble, they are not accepted as the only cause. Another theory advanced is that in working upon low fuel consumption the practical limit of fuel economy was approached, and, in so doing the reduced ore, as fine powder, gradually sank as the column of fuel was lessened, until this reduced ore, at a high temperature, met the oxygen in the blast near the tuyeres and was reoxidized, producing an infusible material, clogging the hearth and reducing its temperature by sudden slips. That the reduced ore appears at the lower part of the boshes as sand seems satisfactorily determined. It may be assumed that a column of incandescent solid fuel exists at the tuyeres through which the metal and cinder drop from the reduced ore. This ore, in normal working, may be at a considerable distance above the tuyeres, but when operating with low fuel this zone of reduced ore may approach closer and closer to the tuyeres, and the trouble may be continually augmenting until reoxidation takes place from a direct or nearly direct contact with the blast of the reduced ore raised to a high temperature.

The necessity of thorough and careful distribution of stock is too little appreciated; and there is no doubt that many disturbances in furnace operation arise from imperfect charging. The relative diameters of bell and stock line are not matters of minor importance; but it is probable that many furnaces suffer from the fact that the stock line has been considered as the point in the shaft of the furnace which the stock reaches when the charge is completed, and the proportion is based upon this. This line is ordinarily a considerable distance above the point where the first part of the charge is dropped; and it would appear more important to proportion the bell to the line of stock when the furnace is sufficiently settled to receive a charge than to the line of stock when the charge is completed. Another cause of disturbance is in the relation which the volume of charge bears to the greatest diameter, and it would appear as essential either to drop all stock thoroughly intermixed or else in such layers as would approximately hold their relative positions in descending through the furnace. If the charge of fuel were sufficient to cover, to a depth of 1 foot, a stock line 12 feet in diameter, its volume would give a layer of 6.7 inches thick at a bosh diameter of 16 feet; and, with no allowance for waste, would bring to the tuyeres in a crucible 9 feet diameter a column of fuel 21½ inches in depth. In many cases the size of the fuel used and the cubic contents of a charge are such that, even if a layer of fuel was distributed with practical uniformity at the tunnel-head, it would be insufficient for a layer at the bosh, and would hence necessitate unequal distribution.

\* From a paper read at the Bethlehem meeting of the American Institute of Mining Engineers, by John Birkinbine, Philadelphia, Pa.

† The Grittinger cinder-cap consists of an opening closed by a hinged door which, when opened, gives a vent of large area (about 100 square inches), and the practice at the North Cornwall Furnace, which is under the control of the manager, is to blow into the cinder for 10 hours after it rises to the tuyeres. This demands high blast pressure, and is attended with more or less risk in case of sudden stoppage of blast; but the assistance thus given in the removal of any accumulation of un-reduced material which obstructs the crucible is deemed a compensation.

The theory of disturbance of the equilibrium, if it may be so expressed, in furnace proportion by the increase in areas from the tuyeres to bosh more rapidly than above the bosh was presented fully by Mr. Cook, and any elaboration of it should in fairness be left to him. Another theory advanced is that the dirt troubles are due to scaffolds. If a scaffold is material adhering or fused to the walls it is not necessarily connected with the dirt troubles described; but if a scaffold is interpreted as an accumulation on the walls, then the dirt troubles accompanied scaffolds. But to admit the latter definition would be to assert that a majority of blast furnaces are scaffolded, and that those which are producing the most satisfactory results are accomplishing their work with scaffolds, for few furnaces are free from a deposit of carbonaceous or other material when in operation, which acts as a refractory lining superior to any artificial composition in use. By reference to the record of the long blast at Warwick Furnace it will be noted that in May, 1882, the thin walls threatened to require putting the furnace out of blast, but that it made its own repairs and continued in operation until September, 1885, when on blowing out the available thickness of the fire brick walls was but 4½ inches, the accumulated material which laid against them or which formerly may have been adhering to the walls having formed a refractory lining. This experience at Warwick Furnace is not unique. Other furnaces have been able to continue in successful operation by reason of an accumulation protecting the brick-work long after the necessity of blowing out had been deemed imminent.

The record presented in the operation of the Warwick Furnace very properly encourages comparisons with results obtained at other plants, differing in dimensions, in ores or fuels used and in the temperature of blast employed, and the general verdict is that even better results would have been obtained had the furnace been higher or of greater cubical contents, or had richer ores been used, or had coke alone been employed, or had the temperature of blast been higher—any of the above conditions being usually considered as advantageous, and all combined as adding materially to the output and largely augmenting the economy of the operation. Without desiring to question the value of increased height within reasonable limits, I think sufficient practical data are not at hand to demonstrate the superiority of very large furnaces over those of moderate dimensions, although that superiority may be theoretically argued. Other things being equal, a rich ore will naturally improve the yield of the furnace and increase its economical operation, and with richer ores and a higher stack it is not unfair to prophesy even better results than were obtained in the Warwick Furnace. This would seem evident from the following published record of the furnace of the Ohio Iron Co., at Zanesville, Ohio.

The figures cover two campaigns—one of 46 weeks, from June 2, 1882, to May 19, 1883, with the furnace 59 feet high by 13 feet bosh, making 19,495 tons, and the other 26 weeks, from February 4, 1885, to August 11, 1885, with the furnace enlarged to 75 feet high by 15 feet 6 inches bosh, making 16,913 tons of pig iron:

Dimensions, &c.	Old.	Enlarged.
Height of furnace	59'	75'
Diameter of bosh	13'	15' 6"
Diameter of hearth	8'	8'
Height of tuyeres above floor	5' 6"	5' 6"
No. of tuyeres	5	5
Diam. of nozzles	5½"	5½"
Diameter of bell	4' 9"	4' 9"
Diam. at stock line	10' 6"	11'
Three Whitwell stoves	17' x 65'	17' x 65'
Average diameter of blast	1400° F.	1400° F.
Two engines, steam cylinder	32½" x 60"	32½" x 60"
Blast cylinder	72½" x 60"	72½" x 60"
Average amount of iron made per diem	60.54 tons.	92.93 tons.
Fuel consumption per ton iron:		
50 lb coke + 73 22.30 coal bush.	2920 lb.	
Fuel consumption per ton iron:		
42.75 coke + 55.21 12.46 coal bush.	2908 lb.	
Yield of ore mixture:	55.43 per cent.	59.70 per cent.
Limestone per ton iron:	1 ton.	0.51 ton.
Pig iron per week:	548 tons, 226 lb.	758 tons, 516 lb.
Fuel per ton in best week:	2330 lb.	1960 lb.

In the above calculation 1 bushel of coal of 80 pounds is taken as equal to 1 bushel of coke of 40 pounds. The weights given are therefore calculated coke equivalents, and the actual weights charged were 3812 pounds with the low furnace and 2707 pounds with the new shape. How much of the increased yield or lower fuel consumption is due to the richer ore, to the changed proportions of the furnace other than height, to the general repair and improvement which ordinarily accompanies remodeling, or to the advance in practice during two years of business depression, it is impossible to determine. In both campaigns the amount of mill cinder was about the same, say 25 per cent., but in the first blast another 25 per cent. was native carbonaceous ore, carrying high silica. The ore mixture only yielded 55.43 per cent., as against 59.70; it was also more siliceous, both from the nature of the material used and as is evidenced by the higher lime required. This was one cause of the larger fuel consumption. In the last blast about 25 per cent. was mill cinder, and the balance was made up of Lake Superior ores, with the exception of some 2700 tons of magnetic ore. The Superior ores were part No. 2 and No. 2 specular ores and hematites, carrying at least an average of 6 per cent. silica. A noticeable feature in the work was that up to the time 14,054 tons were made the average fuel consumption was 2150 pounds to the ton. Some magnetic ore was then used, and the fuel went up to 2208 pounds for the whole amount of iron made. In these figures the raw coal is reduced to assumed coke equivalents, which prevents the use of these data for direct comparison with other blast-furnace results, the average being from 750° to 800°. The perished by thousands from drought.

employment of mixed fuels generally introducing complication into such calculations.

The use of coke in connection with anthracite coal has been, it is believed, rendered necessary rather by the circumstance that the machinery of older plants was insufficient to meet the requirements of modern practice than on account of any inherent inferiority of anthracite as a blast-furnace fuel. If, as seems to be demonstrated, fuels rank in value in proportion to their surface exposure, charcoal is superior to coke, and coke exceeds anthracite, as a blast-furnace fuel; but, as higher pressure of blast increases the value of coke as a fuel, so a further intensity augments the results with anthracite. It has been the general custom to charge anthracite in large lumps, thereby offering a minimum of surface exposure for a single weight, but that practice has lately given way to the use of what is in the trade known as "steamboat" size, with improved result. A still further reduction in size will, it is believed, be advantageous by offering greater surface exposure, but at the expense of increased blast pressure; and the suggestion is offered that in a plant specially equipped to use anthracite coal in small pieces results may be obtained which will demonstrate its real

actual time in blast was 99 days, and the results obtained were an average product of 39.65 tons of pig iron per day from ores yielding 58.10 per cent. of iron and requiring 31½ per cent. of flux. The fuel consumption for the entire blast was 88.86 bushels = 1954.92 pounds, or, deducting for filling of furnace for blowing in, 88.3 bushels = 1942.6 pounds. Mr. Lee Burt writes that the Vulcan Furnace, Michigan (10 feet 6 inches diameter of bosh by 53 feet in height), for seven months, September, 1885, to April, 1886, averaged 51 tons of iron per day from ores yielding 60 per cent. iron, the consumption of fuel per ton of iron ranging between 1900 and 2000 pounds of charcoal. Seven tuyeres each of 3½ inches diameter blow into a hearth 7 feet 2 inches in diameter, 4 feet above the floor.

Mr. John Hartman, in a published record of a selected week's operation of the Franklin Furnace, New York, furnishes the following data: Diameter of hearth, 9 feet; diameter of bosh, 14 feet; bight, 70 feet; diameter at stock line, 11 feet; diameter of bell, 6 feet 6 inches.

Fuel per ton of pig iron (63½ per cent. coke, 63½ per cent. anthracite coal), pounds.... 2,538 Ore per ton of pig iron, pounds..... 5,091 Limestone per ton of pig iron, pounds..... 1,426 Cubic feet of air per minute..... 13,514

\* Equivalent to 2 cubic feet per minute for each cubic foot of furnace capacity.

Temperature of blast..... 1,100° F. Gross tons of iron made..... 614 Cinder made per ton of pig iron, pounds..... 2,474 Contents of furnace, cubic feet..... 6,731 Grade of iron: 342 tons No. 1, 290 tons No. 2, 12 tons No. 3.

The ore, a fossiliferous hematite composed principally of fine grains or shots, is of the following composition:

Iron..... 44.00	Magnesia..... 3.30
Silica..... 12.20	Carbonic acid..... 6.30
Alumina..... 5.04	Water..... 4.10
Lime..... 6.30	Oxygen..... 18.86

Analysis of the Cinder Shows

Silica..... 35.98	Magnesia..... 0.38
Alumina..... 11.90	Sulphur..... 1.12
Lime..... 43.67	Oxide of iron..... 1.02

Mr. John J. Fronheiser, of the Cambria Iron Co., under date of April 7, writes: "We consider our No. 6 furnace of the best size and shape for the ores we work. It is 75 feet in height, 19 feet bosh, and is blown through six tuyeres 6 inches wide at the nose (see Fig. 3). This furnace has now

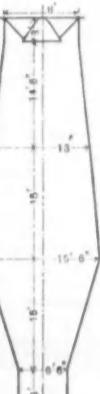


Fig. 1.

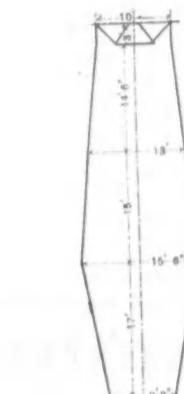


Fig. 2.

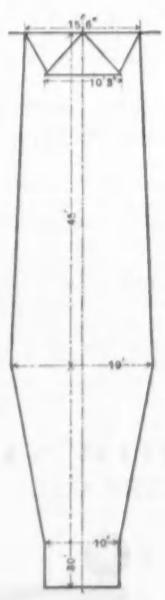


Fig. 3.

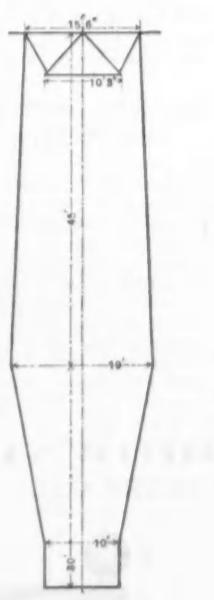


Fig. 4.

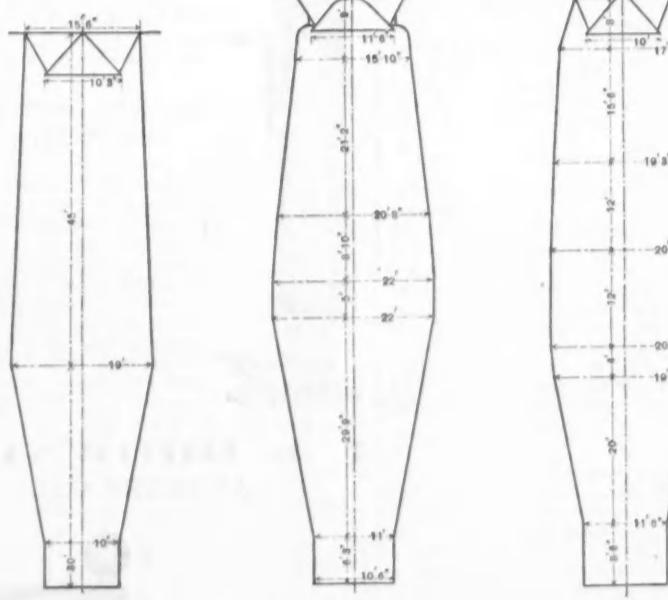


Fig. 5.

BLAST FURNACE SECTIONS.

value as a fuel for blast furnaces. Without going into heat calculations, it seems safe to assert that if 900° temperature of blast are better than 600°, then 1200° should be preferred to 900°, and 1500° to 1200°; but it is equally safe to assert that the large economies promised by the application of what may be termed "superheated blast" have not been realized; and records may be noted which, although accomplished with temperatures not exceeding 1000° F., are unequaled by better-equipped plants using equally good stock.

Results obtained at various blast furnaces are presented below for comparison with those of the Warwick Furnace and with others which have or may be given in the discussion.

Furnace E of the Edgar Thomson Steel Works (20 x 80 feet) made, from June 27, 1882, to March 13, 1884, a product of 105,741 gross tons of Bessemer iron on a consumption of 2822 pounds of coke per ton of iron. See Fig. 5. Furnace D, with the same lines, made from April 18, 1882, to October 30, 1883, a product of 90,317 gross tons of Bessemer iron on a consumption of 2620 pounds of coke per ton of iron. Furnace D, as blown in September, 1885 (22 x 80 feet), see Fig. 4, is making at present 210 gross tons of Bessemer iron per day on 2050 pounds of fuel per ton of iron, this being the record for seven weeks. The best week's work averaged 218 gross tons daily on 1993 pounds of coke. The yield of ore in the furnace is 60 per cent.; the temperature of blast, 1100° F. For this data I am indebted to Mr. James Gayley, superintendent.

The record of a short blast (August 10th to December 1st, 1885,) of the Pine Lake Furnace, Michigan (bush diameter 10 feet 4 inches, height 50 feet, blown with five tuyeres) is furnished by Mr. R. M. Chassie, as follows: The stock used was:

2,269,677 pounds hard ore... Lake Superior	12,935,547 pounds soft ore... district
Total, 15,108,224 pounds = 6,744.74 gross tons.	
486,130 pounds flux = 217.02 gross tons.	
345,792 bushels of charcoal (22 pounds each) charged by weight.	

There were used in filling the furnace 2160 bushels of charcoal, which are included in the above. Made 3925½ tons of iron. Of this 26.4 per cent. was No. 1, 14 per cent. No. 2 and 19 per cent. No. 3, and the remainder higher numbers. The temperature of the blast ranged from 700° to 850°. The perished by thousands from drought.

### MANUFACTURING.

#### Iron and Steel.

A company with a capital stock of \$60,000, to be known as the Pittsburgh Iron Car Works, is being formed in Pittsburgh. Prospects have been sent out to business men, and it is claimed nearly half of the capital stock has been subscribed. The company will manufacture iron cars such as are now used at the Lucy Furnace, and forge and structural work in general. Jos. H. Gartside, of Pittsburgh, is at the head of the movement. He is confident of success and expects to have a new mill in operation inside of a year.

Of the iron manufacturers not represented at the recent scale conference the following have accepted the scale: The North Chicago Rolling Mill Co., at Bayview; the Sharon Iron Co., at Sharon; the Girard Iron Co., at Girard, Ohio; the Youngstown Rolling Mill Co., Youngstown, Ohio; Brown, Bonnell & Co., and the Enterprise Rolling Mill Co., at Youngstown, Ohio.

The Whitaker Sheet Iron Mill, at Wheeling, has signed the Amalgamated Association scale. It involves an increase of 50 cents per ton for hot cinder fix and pay for changing rolls—two new features at this mill.

A 10 per cent. reduction in the wages of the makers, feeders, cutters and packers in the spike department of Dilworth, Porter & Co.'s mill, at Pittsburgh, has been made. The workers have appointed a committee to confer with the firm and demand a repeal of the order.

The nail factory of Jones & Laughlins, at Pittsburgh, was put in operation on the 29th ult., after being idle exactly 13 months. Preparations to start up the other factories there are being made. Shoenerberger & Co. are putting a new set of boilers in their nail department. Chess, Cook & Co. will start their new steel works at Rankin Station, near Pittsburgh, which has been completed several weeks, in readiness to supply nail plates to their factory

and expensive manner. A switch from the newly-completed Pittsburgh and Whitehall Railroad runs into the building, giving excellent shipping facilities. The building is 100 x 200 feet in size and is fire-proof.

**Machinery.**

The Bignal & Keeler Mfg. Co., of St. Louis, Mo., recently shipped one of their new nipple machines to Kauas City; one No. 8 Peerless pipe cutting and threading machine to Pittsburgh, and one of their new shingle machines to Louisiana. They are now busy on orders for their various special machines.

About 60 of the 200 employees of the Westinghouse Machine Co., of Pittsburgh, have been suspended for an indefinite length of time. The suspension is due to having a very large amount of stock on hand at present, and the men will probably be out of work for several months.

The Lewiston (Me.) Machine Co. have just contracted to build another hundred worsted looms for the Manchester mills. This makes the fourth hundred of these looms that the Lewiston Machine Co. have made for these mills.

The Union Switch and Signal Co., of Pittsburgh, have concluded an arrangement with the Pittsburgh, Virginia and Charleston Railroad authorities to put in their switching and signaling system on the Southside. It has also contracted with the Rapid Transit Co., of New York, to put up their signals and switches in Harlem. At a meeting of the company held last week \$500,000 of the present capital was made preferred stock.

The Electrical Supply Co., of Ansonia, Conn., have added several braiders and cabling machines to their equipment.

The Otis Iron and Steel Co., of Cleveland, recently finished the top section of the anvil block for a 15-ton hammer now being built by the Morgan Engineering Co., of Alliance, for the Crescent Steel Works, of Pittsburgh. The section weighs 55,170 pounds. This is said to be heavier by more than 50 per cent. than any other steel casting ever made in this country.

The Wright & Adams Co., Quincy, Ill., have just completed and have ready for shipment a hoisting plant for the Paymaster Mining Co., of Colorado, consisting of a 30-horse power vertical boiler, a winding engine of 500 feet winding capacity, a sinking pump, ore buckets, &c., all complete, ready for work.

The Smith, Beggs & Ranken Machine Co., St. Louis, Mo., have about 15 steam engines in various stages of work, with diameter of cylinders running from 12 to 26 inches. Included in these are the three large engines for the Tudor Iron Works, and two for sawmills at Weatherford, Tex. In the flywheel line they have some very heavy work, principally for the new engines ordered from them. The heaviest wheel in the shop is the one in work for the blooming department of the Western Steel Co.; this will be 26 feet 8 inches in diameter and composed of 10 sections, each weighing 10,000 pounds. When finished, with center added, the total weight will probably exceed 100,000 pounds.

Forbes & Curtis, Bridgeport, Conn., report an active trade. They are running to their utmost capacity, and are behind their orders. They are negotiating for a large shop, which they propose to erect to a model plan, and will, by the change, very greatly increase their capacity. They are just completing a new double-header milling machine, the invention of Mr. Forbes.

Stokes & Parish, 3001 Chestnut street, Philadelphia, manufacturers of elevators, report a very brisk business. The orders received by them continue to be very gratifying, and they inform us that the outlook is excellent. Prominent among the orders now awaiting execution might be mentioned the following in Philadelphia: In the new building on Market street, above Thirteenth street, to be occupied by Henry Gibson, will be erected one passenger and one freight elevator; in the Philadelphia and Reading Railroad office, on Fourth street, below Walnut street, will be placed one passenger elevator; Baily, Banks & Biddle, cor. Twelfth and Chestnut streets, will have one freight elevator; B. F. Dewees, on Chestnut, below Twelfth, one passenger elevator; Elleton P. Morris, on Arch street, above Seventh, will have two passenger elevators erected; Hood, Bonbright & Co., have given orders to have seven elevators built, both passenger and freight, for their new building at the corner of Eleventh and Market streets. In addition to the above the Crane Iron Co., at Catawissa, Pa., will have erected one steam hoist for furnace, and the Cambria Iron Co., Johnstown, Pa., will also have one steam hoist for furnace built; Ogden Mills, of New York City, will have erected in his residence one passenger elevator, and the Young Women's Christian Association, of the same city, have also ordered one passenger elevator. The distinct feature claimed for their elevators by the manufacturers is that they are specially adapted where rapid transit is required. Although not quite as smooth running as the hydraulic, they fully make up this deficiency in the cost, as they are claimed to be considerably cheaper than the hydraulic elevator.

The Atlantic Engine Works, of Indianapolis, Ind., are doing a very flourishing business. They have ceased making portable engines, and are turning out only stationary engines, and have just secured the contract to furnish power to the Minneapolis Exposition. The works have orders ahead for their sand molding machine to keep them busy for six months' steady work.

Meers, Hasselman & Sons, proprietors of the old Eagle Works, Indianapolis, Ind., are running double turn, and cannot ship their threshers and traction engines fast enough to fill orders. The large grain crop has caused an unlooked-for demand for improved machines.

**Miscellaneous.**

The various glass houses in Pittsburgh closed down on the evening of the 3d inst. for the summer. For from 30 to 60 days

about 800 men will be idle. Twenty-seven window-glass factories with 270 pots will be shut down at least to the 1st of September. Sixteen tableware manufacturers will close up their 379 pots for 30 days, and 16 bottle manufacturers will be idle for the same length of time.

The Atlas Bronze and Tuyere Co., Limited, have commenced operations on Smallman, between Twenty-eighth and Twenty-ninth streets, Pittsburgh. They will manufacture bronze tuyeres, coolers, bosh plates, engine and rolling-mill brasses. A new building has been erected and work commenced. A. C. Milligan is chairman; J. E. Blackmore, secretary and treasurer, and W. S. Bostwick, general manager.

Indianapolis, Ind., has suffered very much on account of the general labor troubles in the way of large buildings, particularly iron structural work. The Haugh, Ketchum & Co. Iron Works say they have not near the volume of business that they get usually; that almost no new contracts are offering except in the county, where they are filling several contracts for wrought work, in which branch they are fairly busy. One instance of the prosperity of the city is the remarkable growth of the suburbs. Haughville, which a few years ago was a stretch of fields and commons, with the buildings of a few manufacturers, now is laid off in regular streets, with comfortable houses, principally belonging to the laboring classes. The I., B. and W. and the I., D. and S. Railroad shops and yards are located here; also the Haugh, Ketchum & Co. Iron Works and the Indianapolis Malleable Iron Works. This latter company have lately commenced, in addition to their malleable department, a foundry for gray-iron castings, shelf hardware, &c. Belmont is another beautiful suburb, lower down the river. It is well laid out with long avenues shaded by maples. In Belmont are situated the Indianapolis Car and Mfg. Co. and the Nordyke & Mannion Co. The latter firm report business very good, with prices holding good on all of their work, which is of the highest grade of machinery and millwork. Belmont is well lighted by electric lights elevated 100 feet on wrought-iron skeleton towers.

Samuel C. Tatum & Co., Cincinnati, Ohio, are just finishing for a special order a copying press which is believed to be the largest yet made. It will take in a book 24 inches wide and 32 inches long, and weighs little less than  $\frac{1}{2}$  ton. Notwithstanding its great size, the design of the press has been carried out upon graceful lines, and at the same time attention has been given to placing the material where it will be most needed.

Recently there were offered for sale by auction, in London, 10 extensive Scotch estates, comprising about 74,000 acres, including woodland, deer parks and improved property. Every one of these estates was bought in by the auctioneer for the owners, the prices offered being far below the lowest valuation. One piece of property of 8000 acres, with a fine mansion, giving an income from rentals of more than \$25,000 a year, was met by an offer which at 3 per cent. would only have returned the amount of the rentals.

The agreement entered into a few months ago by which some of the trunk lines were to bear the responsibility of losses on freight destroyed or detained on any of the fast freight lines, controlled by them seems to have been executed by the carriers in good faith. Inquiry develops the fact that the New York Central and other roads now meet the losses occasioned by these subordinate companies. This state of affairs is considered eminently satisfactory.

President Purroy, of the New York Fire Department, recently returned from London, is strongly impressed with the necessity of making our building laws conform to those of London and Paris with respect to the fire-proof character of buildings, thus rendering fire a much less dangerous element. He also advocates the introduction of portable electric light, which would prove useful in contending with fires in sub-cellar.

The Manufacturers' Record notices the continuance of organized movements throughout the South for the development of manufacturing and other forms of industrial activity.

Axide from smaller undertakings, no less than 70 enterprises of considerable importance came under notice in a single fortnight. These latter include numerous mills for textiles, lumber, grain, &c.; also factories for the production of furniture, brooms, doors and a variety of other articles.

One of the phenomenal features in the development of the southern counties of California is the productiveness of the Colorado Desert when water can be secured. Artesian wells have been sunk, and by irrigation it is found that grapes and many other kinds of fruit can be produced from a month to six weeks earlier than elsewhere in the State.

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**Wrought Iron.**  
**Anti-Friction.****IT EXCELS ALL OTHERS**

IN Security of Door.

Strength of Material.

Ease of Motion.

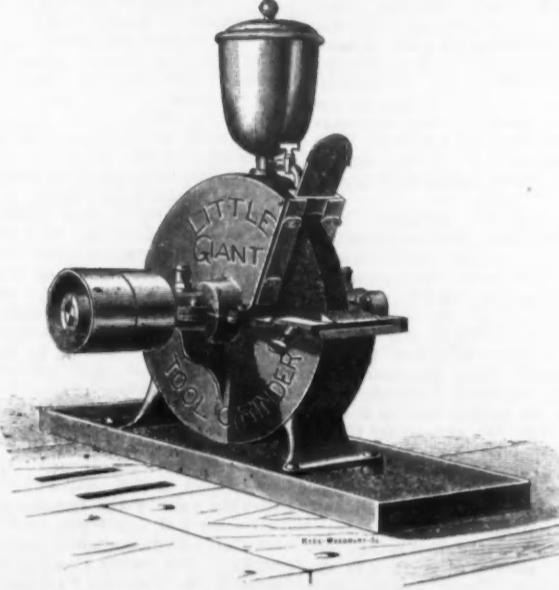
Simplicity of Application.

**THIS HANGER**

Requires no Oil.

Has no Flanged Wheels.

Packs Snugly for Shipment.

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MFG. CO.,  
Newburyport, Mass.**LITTLE GIANT TOOL GRINDER****Browne's Exterminator**

For exterminating all kinds of burrowing animals, such as

**GOPHERS, PRAIRIE DOGS, GROUND SQUIRRELS, BADGERS, ETC., ETC.**

This is an apparatus for burning straw and sulphur and forcing the smoke and gas down their holes, which kills them.

Over 2000 Sold in the Last 60 Days.

Being unable to supply the increasing demands, I am desirous of allowing responsible parties to manufacture on a royalty. They can be made in any tinshop, and cost about 50 cents. Will send a sample Exterminator to dealers for 75 cents. Weight about 5 lbs. Circular free. Write for particulars and secure territory. Address

Pat. June 5, 1886.

**F. E. BROWNE,**

LOS ANGELES, CAL.

MANUFACTURED BY

The Little Giant Tool Grinder is designed to sharpen machinists' tools of all kinds. Running a Corundum Wheel in water, the grade of wheel varying to suit the kind of work to be done, all danger of drawing the temper from hardened tools is avoided. The particles of Corundum composing the wheel are hard and sharp, and will cut many times faster than the ordinary grindstone, and at the same time be more exact, as the operator stands near the wheel. It takes up less room; it is cleaner; it makes no offensive smell, and is the cheapest general tool grinder ever produced. This machine can be set up anywhere, taking up bench-room of only 22 x 12 inches, thus allowing several to be located on a floor in large shops, having them conveniently situated for the men, so as to avoid walking long distances to sharpen a tool. The saving of time in this way alone will soon pay for the small cost of the grinder. The wheel being covered with a hood, except where the grinding is done, no water flies off. We have adopted for use in this grinder a special Corundum Wheel, which, by reason of its porous nature, is constantly moist, and in consequence there is no danger of drawing the temper from the tool.

As the Corundum Wheel is to do the work of a grindstone, it should not be run as fast in water for grinding tools as is recommended for a wheel running dry for general purposes. Speed of wheel, 700 to 900 revolutions per minute. Weight, 60 pounds. Runs wheels 10 x 1 inches and 10 x 2 inches.

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**THE NEW YORK SUPPLY CO., LIMITED,**

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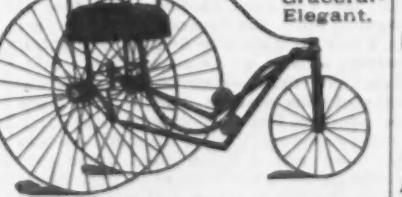
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**THE FAIRY TRICYCLE.**Easy.  
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IMPROVED UNDER PATENTS OF 1875 AND 1876.

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ARE THE ADVANTAGES OFFERED BY THIS BOILER IN A PRE-EMINENT DEGREE.

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## PARAGON ANTI-FRICTION DOOR HANGER.

SPECIFIED BY ARCHITECTS AND BUILDERS.

We make the broad claim that the PARAGON HANGER is the BEST device for operating sliding doors ever shown to the Trade,

## BECAUSE

It is the strongest and most durable, made in one solid piece from air-furnace refined malleable iron (no bolts or rivets to wear and work loose), is the easiest operated, impossible to derail and never requires lubricating, and is by far the handsomest and finest finished Hanger in the market. Using the only polished steel Tee-Rail ever invented. Are made in three sizes (4 to 24 ft. run) for Barn and Warehouse use. No. 4 Parlor Hanger, pat. fiber wheel, absolutely noiseless, cannot wear out. Nos. 5 and 5½ for elevator and small house doors, and No. 6 Car Door Hanger now adopted by the leading railways in the United States.

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**MANUFACTURERS OF AND  
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**FOUNDRY-FACINGS**

**PLUMBAGO OR BLACK  
LEAD**

**For All Purposes.**

**ALSO SHIPPERS OF THE CELEBRATED  
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For Stove Plate, Heavy and Light Machinery, Agricultural and Brass Work.

**Agents for MONK'S CELEBRATED MOLDERS' TOOLS.**

Send for Illustrated Catalogue and Price List.

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**FOUNDRY-SUPPLIES**

**MILLS**

**HEAVY MACHINERY**

**AND FINE  
STOVE PLATE FACINGS**

**A Specialty.**

**S. OBERMAYER FOUNDRY SUPPLY MFG. CO.,**

**CINCINNATI. - - OHIO.**

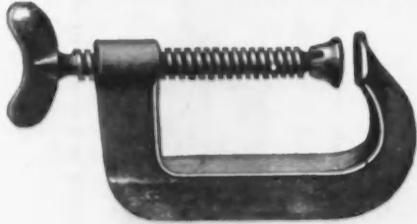
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WITH STEEL TOE CALKS.

The Best and Cheapest Shoes Made.

Warranted to Outwear Any Other Shoe.

Six Sizes Each. Blunt and Sharp Calk.



### Eagle Screw Clamps,

WITH

BALL AND SOCKET SWIVEL.

Ten Sizes. To Open.

2, 2 1/2, 3, 4, 5, 6, 7, 8, 10, 12 inches.

Coach & Carriage Hardware & Fine Mountings  
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Correspondence solicited.

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DYNAMITE  
FOR ALL KINDS OF BLASTINGCAPS. FUSE  
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BLASTING SUPPLIES.

Write for Illustrated Pamphlet. Mailed free.  
Agents wanted.ÆTNA POWDER CO.,  
98 Lake St., Chicago.

The Original Inventors and Manufacturers of the

"OSBORN"

Bright Metal Cages, in Brass, Bronze and Silver Plate.

NEW AND BEAUTIFUL DESIGNS JUST OUT.

We also Manufacture Brass and Bronze Show Stands for Fancy Goods. Catalogues Mailed Free.

### Hardware Novelties.

## New Harvester Knife.

The illustration given below represents a new form of knife or cutter for mowing and reaping machines which has recently been patented by W. S. Taylor, of Huntington, Pa., and which will be manufactured by the Hatch Bros. Co., Bridgeport, Conn. This article is designated as the Taylor Reciprocating Harvester Knife, its special peculiarity being its shape, which is represented in the illustration. It is claimed that the new blade is much superior in cutting efficiency to the old triangular-shaped section knife, the point being made that it cuts much faster, because, while occupying no more space on the cutter-bar, it presents a largely increased cutting surface, owing to the sickle shape given to the sides. It is also

tion. The hanger as thus constructed is the result of much experiment, and is put on the market with the claim that it is exceptionally strong, easy running and durable.

## Atomizer and Sprinkler.

The accompanying illustration represents the construction and use of Goldman's Patent Atomizer and Sprinkler, which is be-



Atomizer and Sprinkler.

ing put on the market by the Alford & Berkely Co., 77 Chambers street, New York. It consists of an iron frame or handle of the form represented, one arm of which contains a rubber ball, while another, under the pressure applied by the handles, presses upon upon the ball and ejects the water or other liquid contained in it. This rubber ball has fine perforations on one side, through which the spray is forced, and the other side has a hole through which, when the ball is dipped in water, the water enters, this opening being closed by the plunger when pressure is applied. The ball is so formed as to fit snugly and firmly into its receptacle. Many uses are designated for this article, such as sprinkling flowers, house plants, clothes, &c., and its simplicity, durability and inexpensiveness are specially alluded to. When the rubber ball is worn out another can be obtained at slight ex-



Taylor Reciprocating Harvester Knife.

claimed that it requires less power than the old knife, and is not liable to clog or choke in any kind of grain or grass, that it can be easily sharpened without being removed from the cutter-bar, and is adapted to the different machines in use. It is put on the market by the manufacturers as the result of continued and successful experiments, and with the expectation that it will meet with general favor. A circular giving full description of this article is issued.

## The Cortland Adjustable "S" Wrench.

The accompanying illustration represents this article as manufactured by the Cortland Wrench Co., Cortland, N. Y., for whom the Ross & Fuller Association, 33 Chambers street, New York, are sole agents. Its form and general features are indicated in the cut. It will be perceived that it is operated by a spiral burr which moves the sliding jaw in the manner indicated. This wrench is especially designed for machinists' use, and its utility in reaching into machinery will be recognized, as well as the value of its adjustable feature, which gives it a wide range. Hence the manufacturers make the point that, while it will do all the ordinary screw wrench performs, and more, it is



The Cortland Adjustable "S" Wrench.

applicable where an ordinary wrench cannot reach or be applied. It is made 8, 10 and 12 inches, and is also supplied with a pipe attachment.

were perfectly clear it would not answer, because the light used in photographing would pass through without resistance, and no record would be made on the tablet. The water is colored for photographing, and the jet is made to fall obliquely on a glass plate.

The water spreads itself out on the glass plate and runs off. It is the water so spread out that it is to be photographed as it passes. Words spoken cause the jet of water to vibrate; the vibrations in the jet cause corresponding vibrations in the film of water as it breaks and spreads on the glass plate and runs off. A ray of light is passed through that film and through the glass plate to a sensitive tablet behind. The vibrations in the liquid film are reflected in the variations of intensity of the impression made on the photographic tablet. Speaking continues, the jet keeps running, the film keeps passing over the plate, the recording tablet keeps moving as the film keeps moving, and the light, passing through this film to the tablet, makes a record of the speech far more accurate than any *verbatim* report.

A member of the New York Yacht Club, who for the present is not publicly known, has closed a contract with Harlan & Hollingsworth, the builders of the iron sloop yacht Priscilla, to build for him a steel schooner yacht. Two besides the Priscilla, the schooner Mischief and the cutter Vindex, are of iron. The advantages of using steel or iron instead of wood, beyond that of lightness in construction, are that such vessels do not become water-soaked; they may be built with fine lines; the weight may be placed deeper; the ballast is not required to be changed at frequent intervals; there is no such nuisance as bilge water, and the inside of the hold is cemented, so that it may be kept perfectly free from the acids and juices of woods.

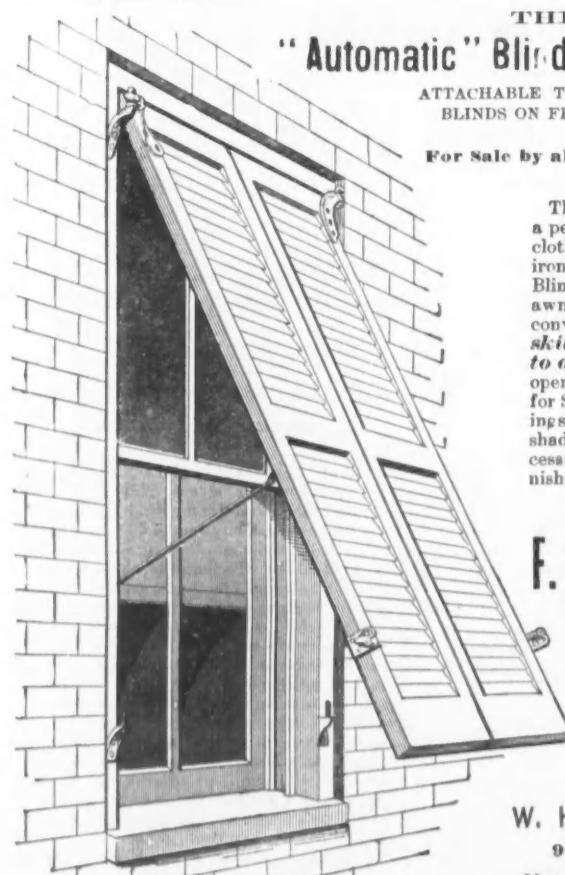
The total assessed valuation of real and personal estate in New York City, as just reported by the Tax Commissioners, is very little less than \$1,421,000,000. That is nearly \$32,000,000 more than the remaining national debt of the United States. Of this vast sum only \$217,000,000 are assessed upon personal property. The increase of valuation over the list of 1885 is nearly \$50,000,000, of which more than \$35,000,000 are upon real estate, mainly in the upper wards. The First Ward is the only one in which there is a falling off from last year. About \$35,000,000 will be required for carrying on the City Government the current fiscal year.

The Senate agrees to appropriate \$1,000,000 for the deepening of New York harbor at Sandy Hook.



Samson Door Hanger.

and the pin driven in. Special attention is also called to the fact that the way or tread for this axle is broad, so that the axle has plenty of surface to run on, and cannot become lodged and cut a bearing place, as others are liable to do. In order to overcome the liability of hangers to spring open and allow the wheel to fall out or prevent it from running properly, the head of this hanger is made of cast iron, and then, to make sure of its having all requisite strength, the top is encircled with a steel strap, as above alluded to, the stiffness of which is greatly increased by the corruga-

**"Automatic" Blind Awning Fixture.**

ATTACHABLE TO OLD AS WELL AS NEW BLINDS ON FRAME OR BRICK HOUSES.

For Sale by all the Hardware Trade.

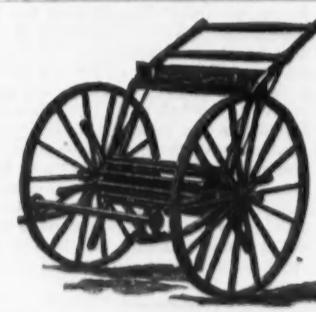
The very best Blind Hinge and a perfect Awning Fixture. No cloth to tear and wear out. No iron frames to shake and rattle. Blinds instantly converted to awnings. Awnings instantly converted to blinds. **No skilled labor necessary to apply them.** A child can operate them. Indispensable for Summer Hotels and Dwellings. Rooms always cool and shady. Many thousands in successful operation. Models furnished to architects.

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MANUFACTURERS.  
**BOSTON,  
MASS.**W. H. JACOBUS & CO.,  
90 CHAMBERS ST.,  
New York Warehouse.**THE SALEM WIRE NAIL CO.,**  
SALEM, OHIO,

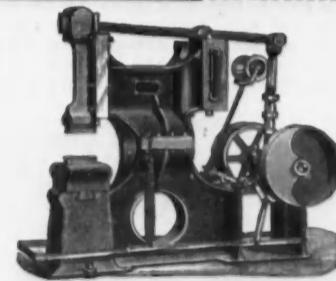
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H. U. WALKER CLAY MFG. CO.,  
Pittsburgh, Pa.CORTLAND ADJUSTABLE S WRENCHES.  
The Best Machinist's Wrench in the World.**The Ross & Fuller  
Association,**33 Chambers Street,  
NEW YORK,  
SOLE AGENTS.**"Challenge" Fire Hose Carriage**Holds from 300 to 800 feet of  $\frac{3}{4}$ -inch Hose; 44-inch Wheels; Patent Swing Tool Box; no weight on handles; nickel-plated trimmings; light and easily handled. Price, including 300 feet best quality  $\frac{3}{4}$ -inch Linen Hose, coupled, \$100.

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**BUFFALO SCALES**  
STANDARD FIRST PREMIUM  
AWARDED AT THE WORLD'S EXPOSITION, New Orleans, Four Gold Medals. All other principal makers competing. Track Scales, Bay Scales, Platform Scales, etc. Important patent IMPROVEMENTS. Best value for your money. For circulars, terms and Blanks for Special Purposes Made to Order.**VULCAN UPRIGHT, CUSHIONED HAMMER**

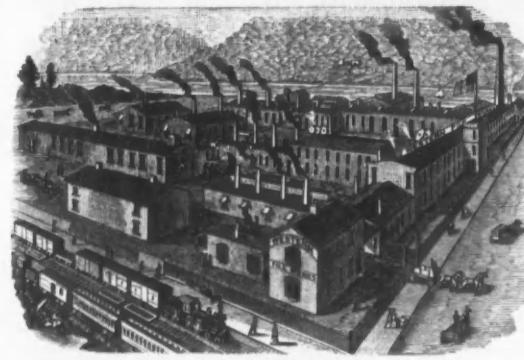
Fulfils all the requirements of a FIRST-CLASS HAMMER. STRIKES A TRUE, SQUARE AND ELASTIC BLOW.

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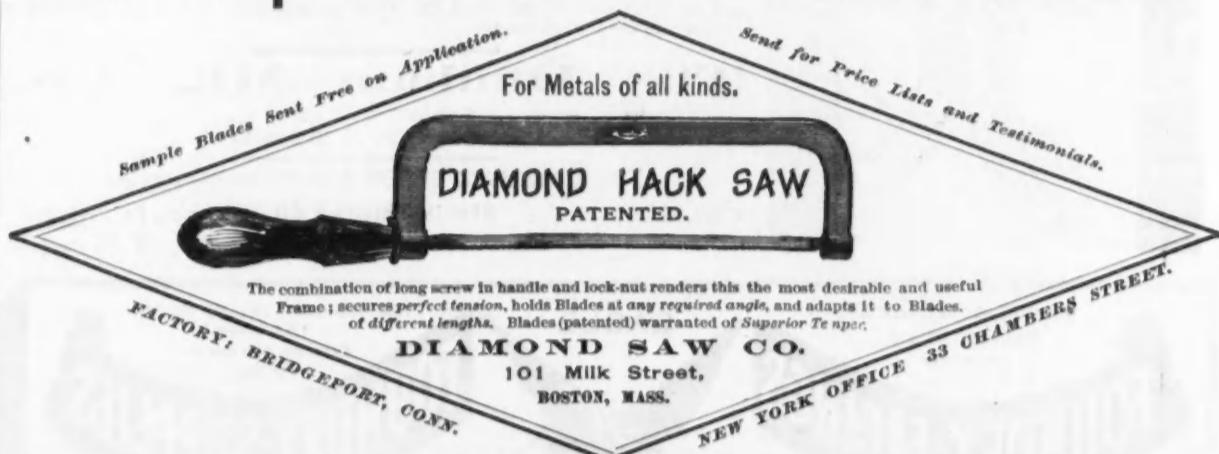
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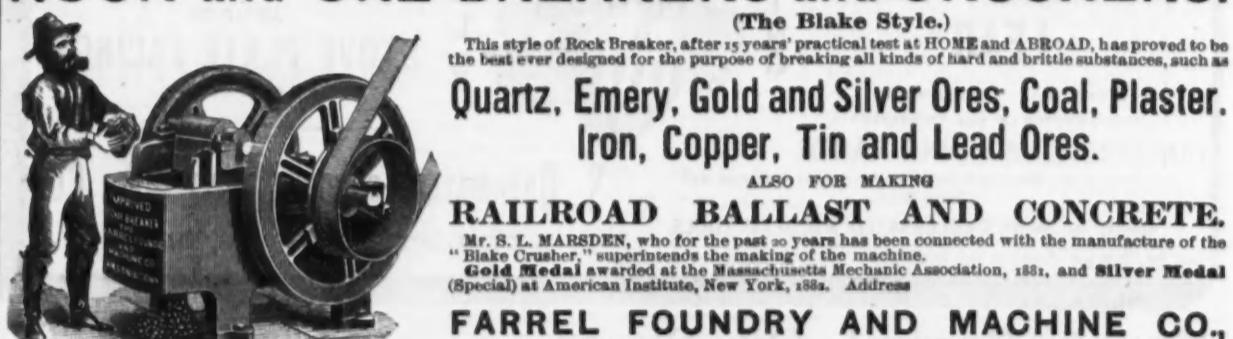
Capacity,

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Warranted.**Files and Rasps of Every Description.****THE BEST IN THE MARKET.**

WRITE FOR CATALOGUE AND PRICES.

**An Improvement in Hack Saws.**

The advantages claimed over all others for these PATENT TOOTH Blades are that they NEVER BIND and will OUTWEAR other saws.

**ROCK and ORE BREAKERS and CRUSHERS.**

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ALSO FOR MAKING RAILROAD BALLAST AND CONCRETE.

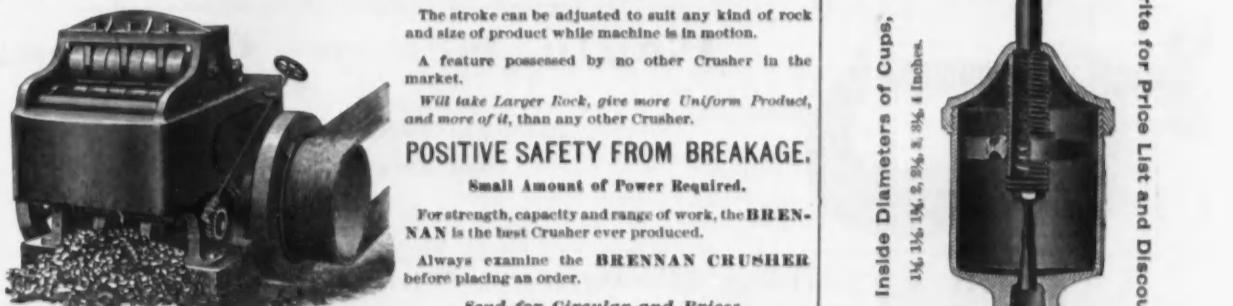
Mr. S. L. MARSDEN, who for the past 20 years has been connected with the manufacture of the "Blake Crusher," superintends the making of the machine.

Gold Medal awarded at the Massachusetts Mechanics Association, 1881, and Silver Medal (Special) at American Institute, New York, 1882. Address

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**BRENNAN****ROCK AND ORE BREAKER AND CRUSHER.**

A NEW AND EFFECTIVE PRINCIPLE IN THE CRUSHING AND DISCHARGING ACTION.



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Patent Automatic Grease Cup.Inside Diameters of Cups,  
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Write for Price Lists and Discounts.**WALKER MFG. CO.,**  
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Established 1830.

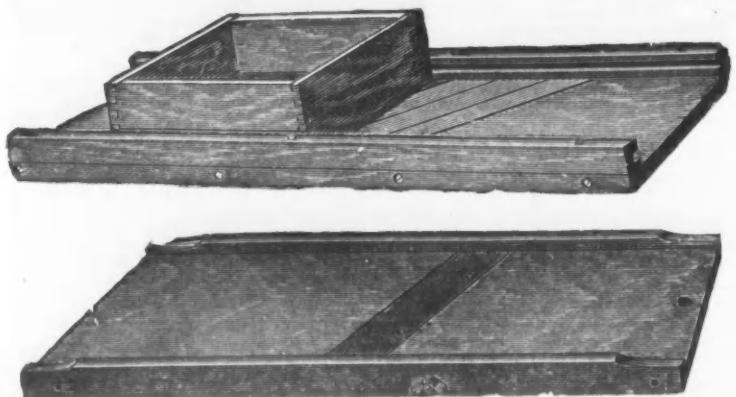
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Raw, Refined LINSEED OIL and Boiled

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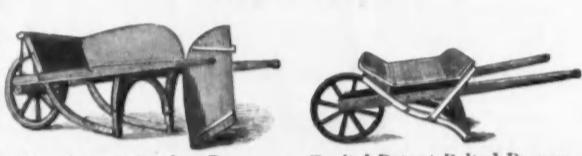
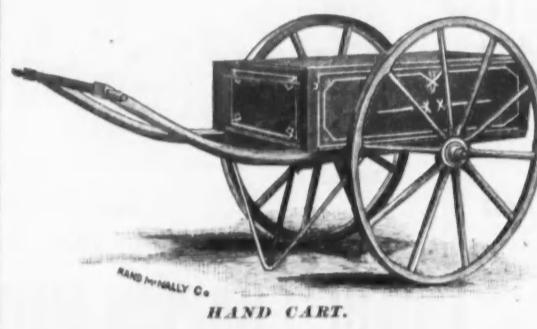
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OIL STONE.

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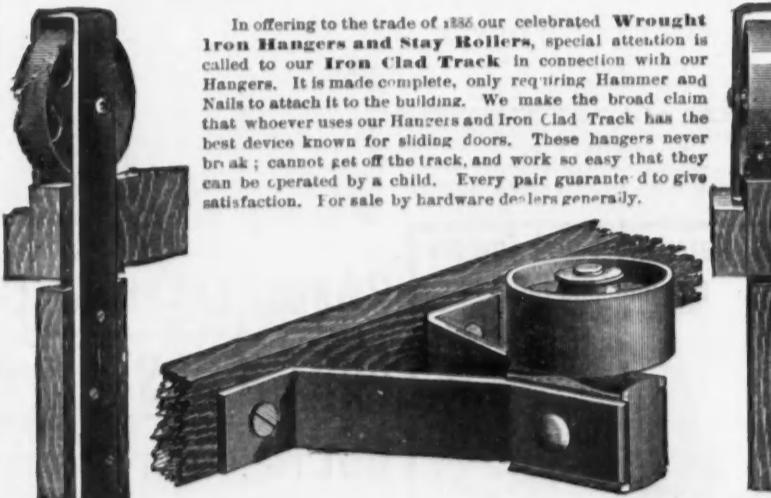
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Globe Patent Garden Barrow. Capitol Patent Bolted Barrow.

CRONK'S

Wrought Iron Barn Door Hanger  
AND STAY ROLLER.



In offering to the trade of 1886 our celebrated Wrought Iron Hangers and Stay Rollers, special attention is called to our Iron Clad Track in connection with our Hangers. It is made complete, only requiring Hammer and Nails to attach it to the building. We make the broad claim that whoever uses our Hangers and Iron Clad Track has the best device known for sliding doors. These hangers never break; cannot get off the track, and work so easy that they can be operated by a child. Every pair guaranteed to give satisfaction. For sale by hardware dealers generally.

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Transom Lifter.  
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Only one style of Lifter in each size for transoms hung at top, centre or bottom. Locking device in plain sight and operated with one hand.

No danger of heavy Transoms dropping and breaking glass.

Send for our new Catalogue.  
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The Best and Strongest Handle in the World.  
Every Pan is made of All-Steel Tin Plate, and re-enforced at the edge with a piece of Tempered Steel, 1/8 inch wide, extending the length of the front and beyond the edge of the pan, which causes it to be always straight and close-fitting to the floor. Cannot become bent or distorted at the edge, and all dirt or dust can at once be brushed on the pan.

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SMALL CASTINGS.  
WARRANTED SOFT, CLEAN, SMOOTH.  
LOW PRICES



ON  
LARGE CONTRACTS.

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Has a Steel Wire Center to prevent breaking, and is unquestionably the best Knife Sharpener made. A few strokes is sufficient to give the dullest knife a sharp, keen edge. Sample orders solicited.

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MANUFACTURERS OF  
VALVES AND GATES

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Water, Steam, Gas, Ammonia, &c.  
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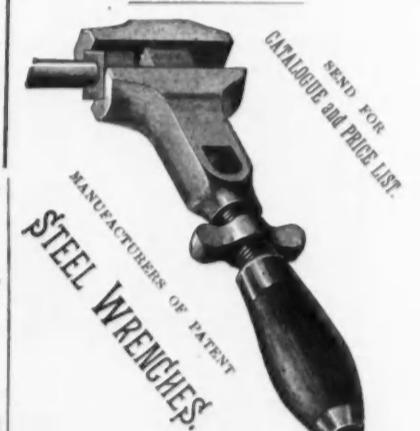
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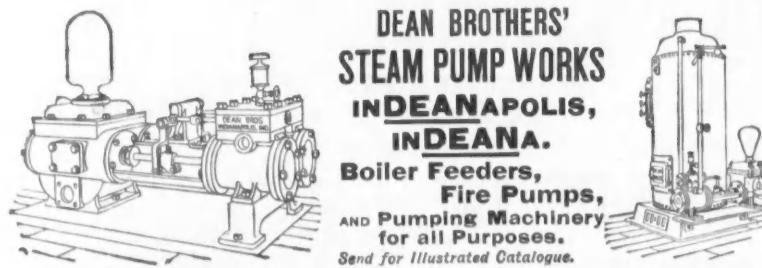
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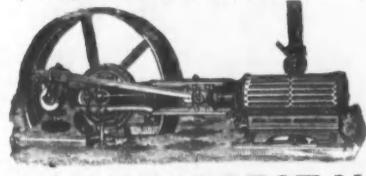
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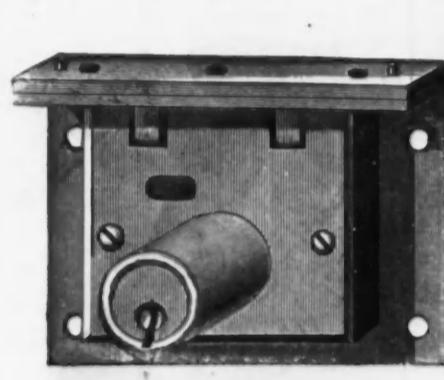
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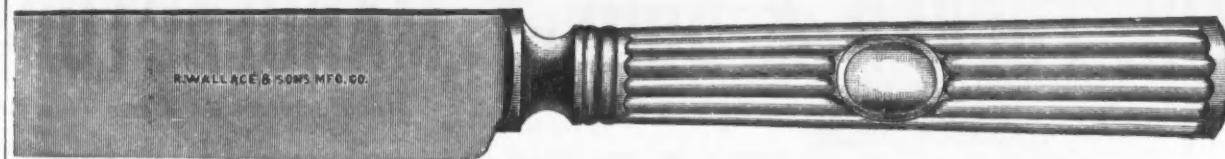
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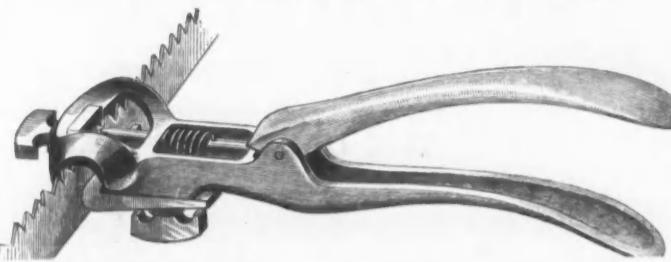
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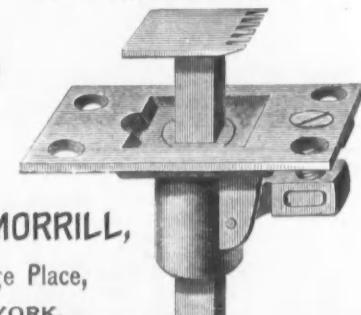
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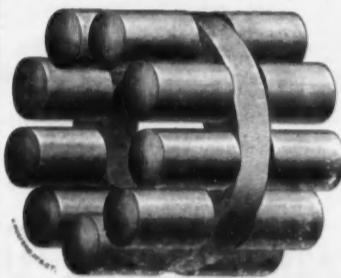


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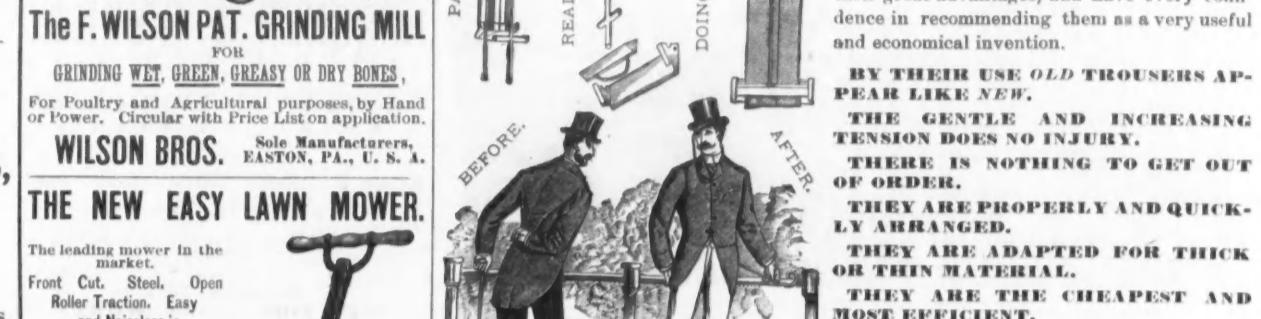
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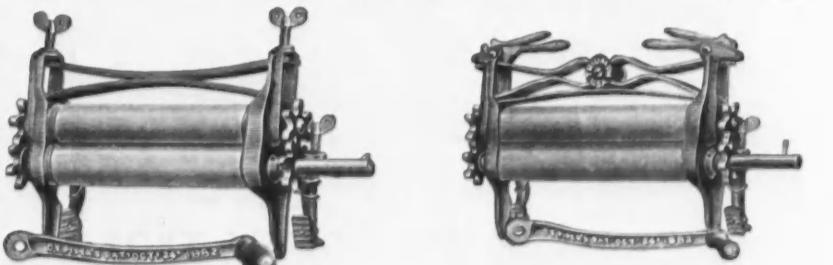
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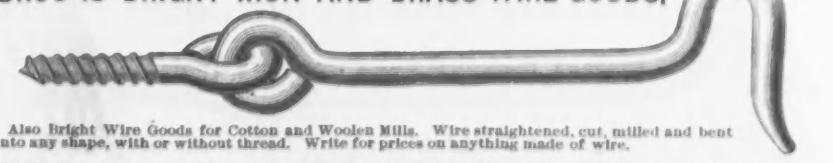
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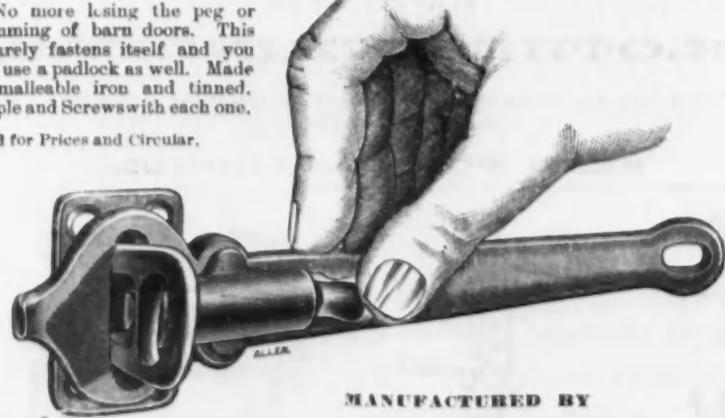
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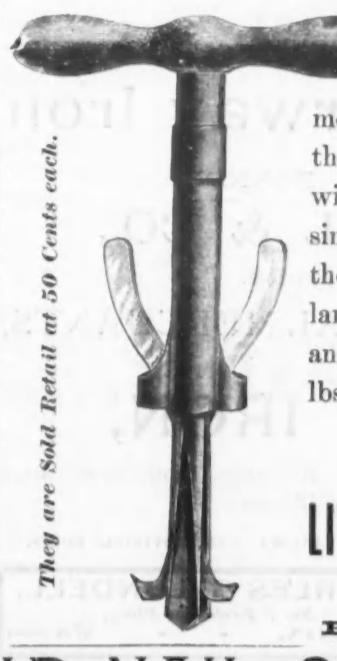
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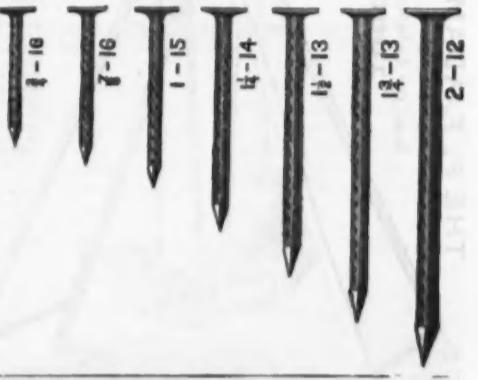
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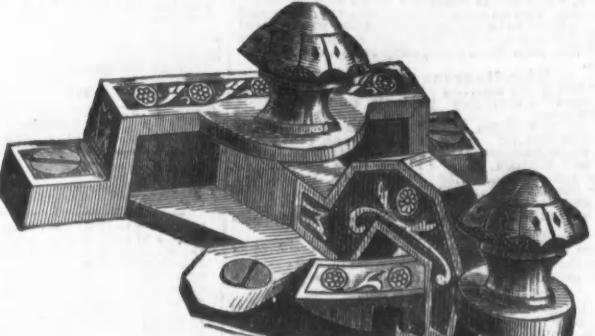
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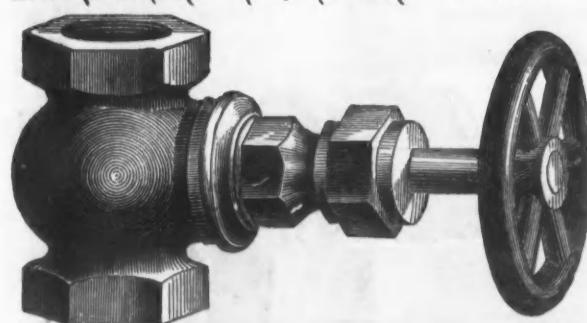
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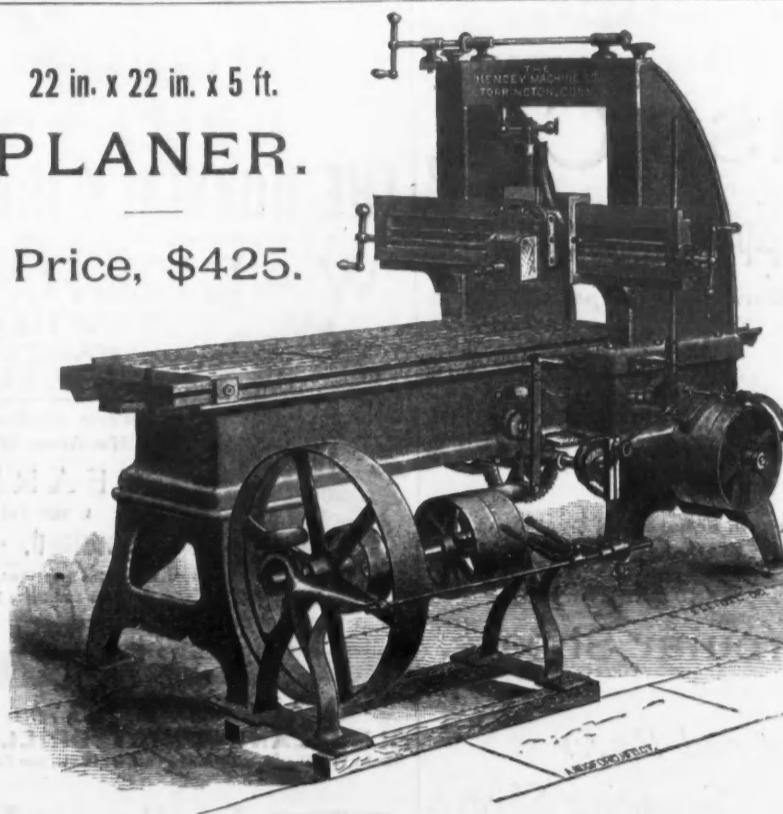
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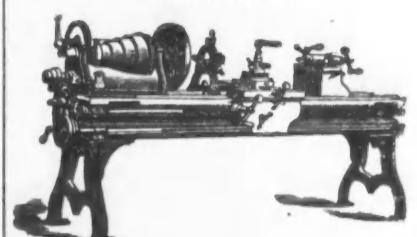
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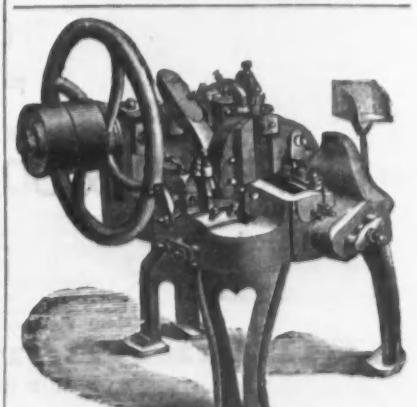
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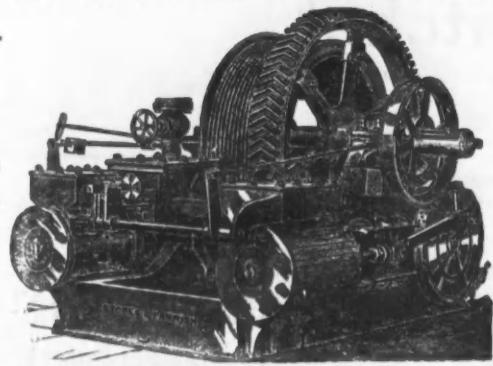


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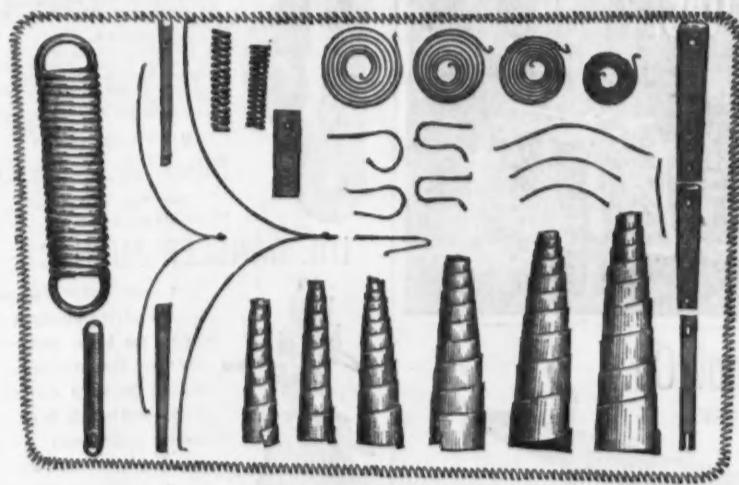
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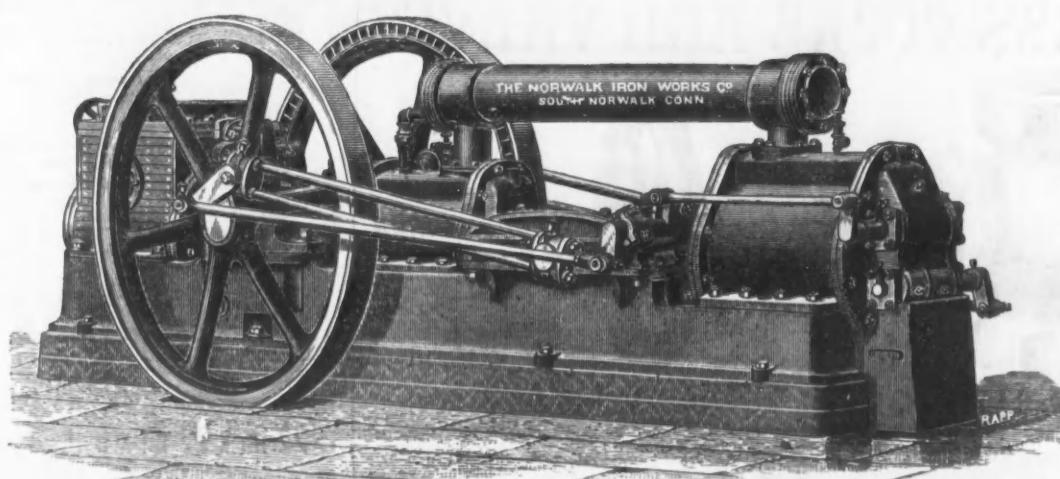
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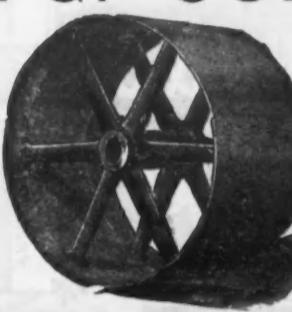
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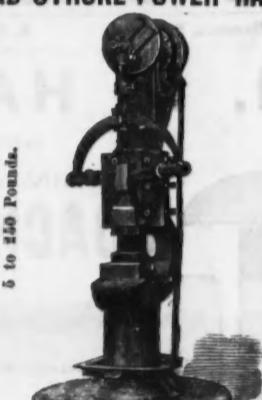
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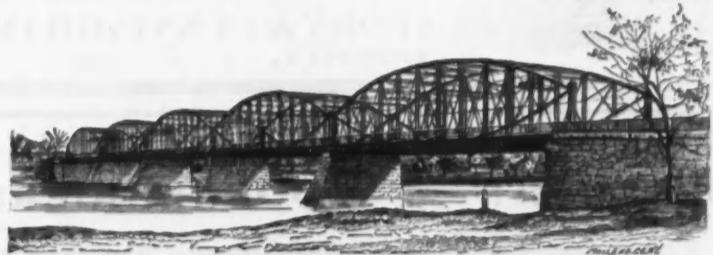
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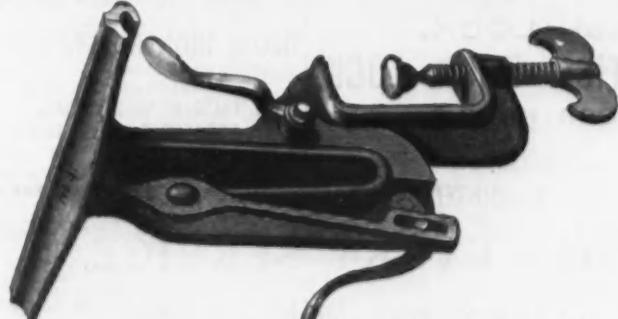
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